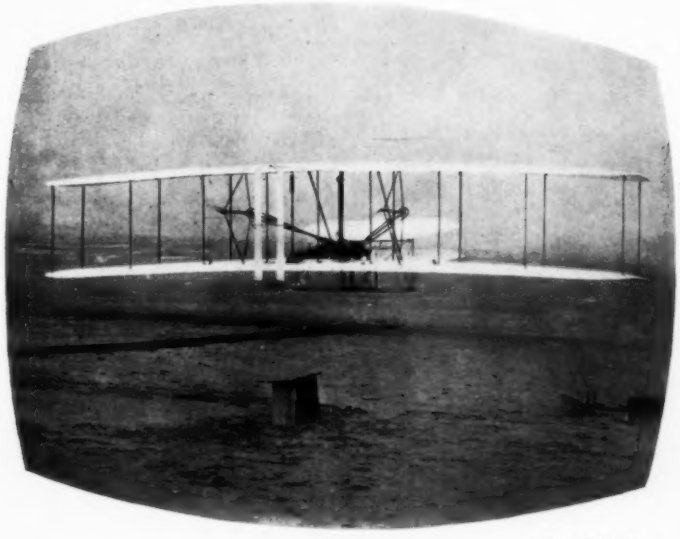
TELEPHONY



Ewing Galloway

VOLUME 120

JANUARY 4, 1941

NUMBER 1

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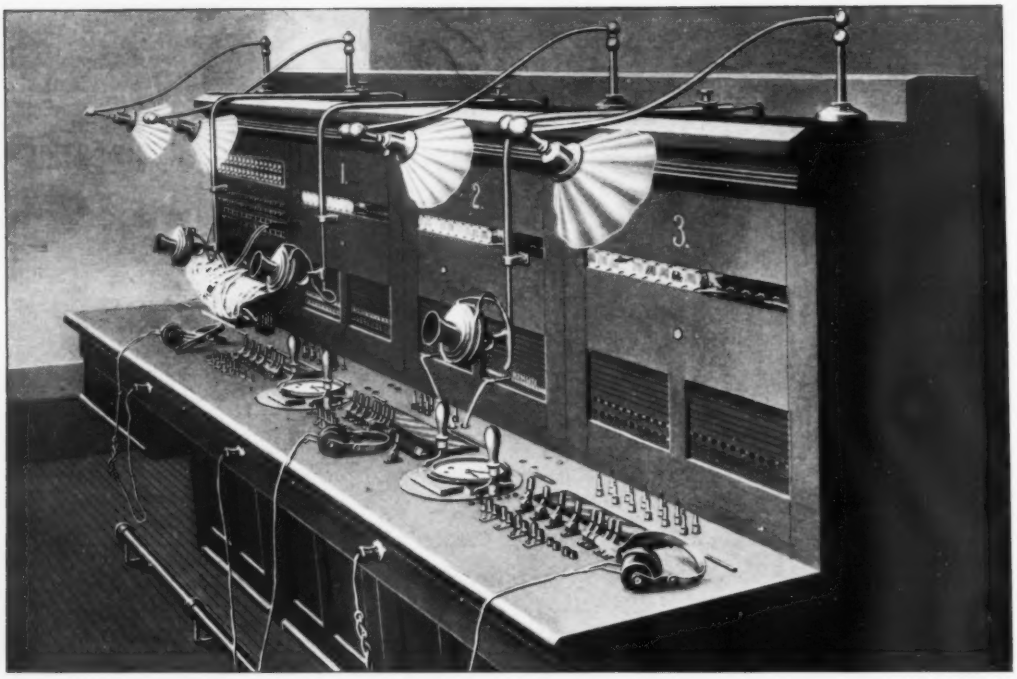

1904
Toll Switchboard in the Syracuse office of the Central N. Y. T. & T. Co.

Brass Rail and Sea Shell Lighting

Back in 1904, this up-to-the-minute toll board, in the Syracuse office of the Central N. Y. T. & T. Co., had everything a self-respecting toll board was supposed to have. Brass rail foot rests for the operators' feet and indirect (or nearly so) sea shell lighting for eye protection.

Oh, yes—and Calculagraphs to take the headaches out of toll timing. Then, as now, taking the guessing out of toll timing saved disputes, assured accuracy, and increased operating efficiency.

Today's new Model 33 Calculagraph is a different animal from the old 1900 Model—streamlined, accurate-to-the-second and as modern as today's modern toll boards. It meets the present demand for an immediate, permanent record of every toll message handled by the central office.

If you are not using the new Model 33, write for the complete story. It will interest you.

SPECIFICATIONS: MODEL 33

COMPACT—7½"x3⅜". Takes up minimum space on switchboard.

WEIGHT—8 pounds.

UNOBSTRUCTED VIEW—Full vision of dial from any position on the switchboard.

SWEEP SECOND HAND—Tells the end of the initial period at a glance.

CALCULAGRAPH COMPANY
Main Office and Plant:
310 SUSSEX STREET **HARRISON, N. J.**

CALCULAGRAPH
Accurate Toll Timing to the Second!

Model 33

TELEPHONY, January 4, 1941. Volume 120. No. 1. Published every week on Saturday by TELEPHONY PUBLISHING CORPORATION, 608 So. Dearborn St., Chicago, Ill. Telephone Wabash 8604. Subscription $3.00 per year. Entered as second class matter September 4, 1908, at the Post Office at Chicago, Ill., under the act of March 3, 1879.

STROMBERG-CARLSON-Equipped Rochester Exchanges Handle Sudden Peak Load

...cal Super-Service Keyboard. Finger ...ts to one of the party-line ringing ...ons common to each position.

Operators at Stromberg-Carlson Super-Service Switchboard in Rochester's Monroe Exchange.

On Thursday, December 12, 1940, it was discovered that an accident had made the drinking water supply of Rochester, N. Y., unfit for consumption.

Alarms were spread by the telephone operators at each of the city's exchanges, advising subscribers to boil the water before drinking. Warnings were also broadcast by radio and sound truck, causing calls from the business section to subscribers' homes and from one neighbor to another. The result was that *between the hours of 9.30 A. M. and 1.30 P. M., the Rochester Telephone Corporation handled twice its normal amount of traffic without delay to subscribers.*

An official of the Rochester Telephone Corporation, in commenting on the subject said: "The crux of the whole difficulty lay in the ability of the exchanges to handle a sudden peak load such as was offered to us. This tested the ability of not only the exchange equipment, but of a well-trained force. The fact that it was handled efficiently speaks well for both of these factors."

The Rochester Telephone Corporation's exchanges are equipped with Stromberg-Carlson Super-Service Switchboards. The simplified construction of these boards enables operators to work with greater speed, efficiency, and accuracy.

If you are operating a central energy exchange of 600 lines or more, let us send you information about Stromberg-Carlson Super-Service Switchboards.

Stromberg-Carlson Super-Service Switchboard used in 600 line exchange.

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
Factory and General Offices: 100 Carlson Road, Rochester, N. Y., U. S. A.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

Stromberg-Carlson

MAKERS OF VOICE TRANSMISSION AND VOICE RECEPTION APPARATUS FOR ...

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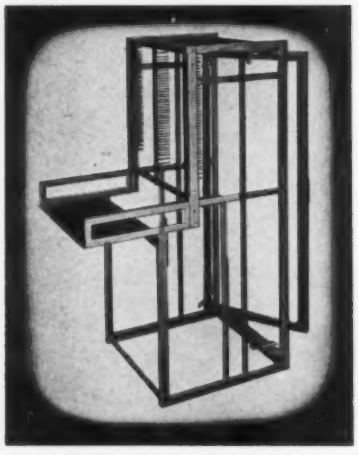
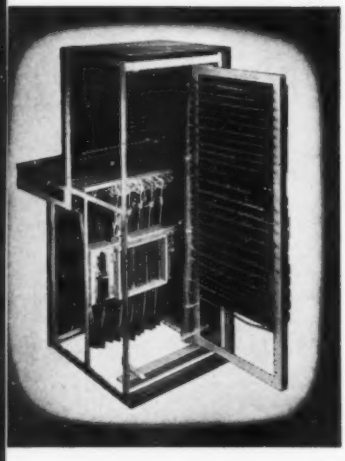
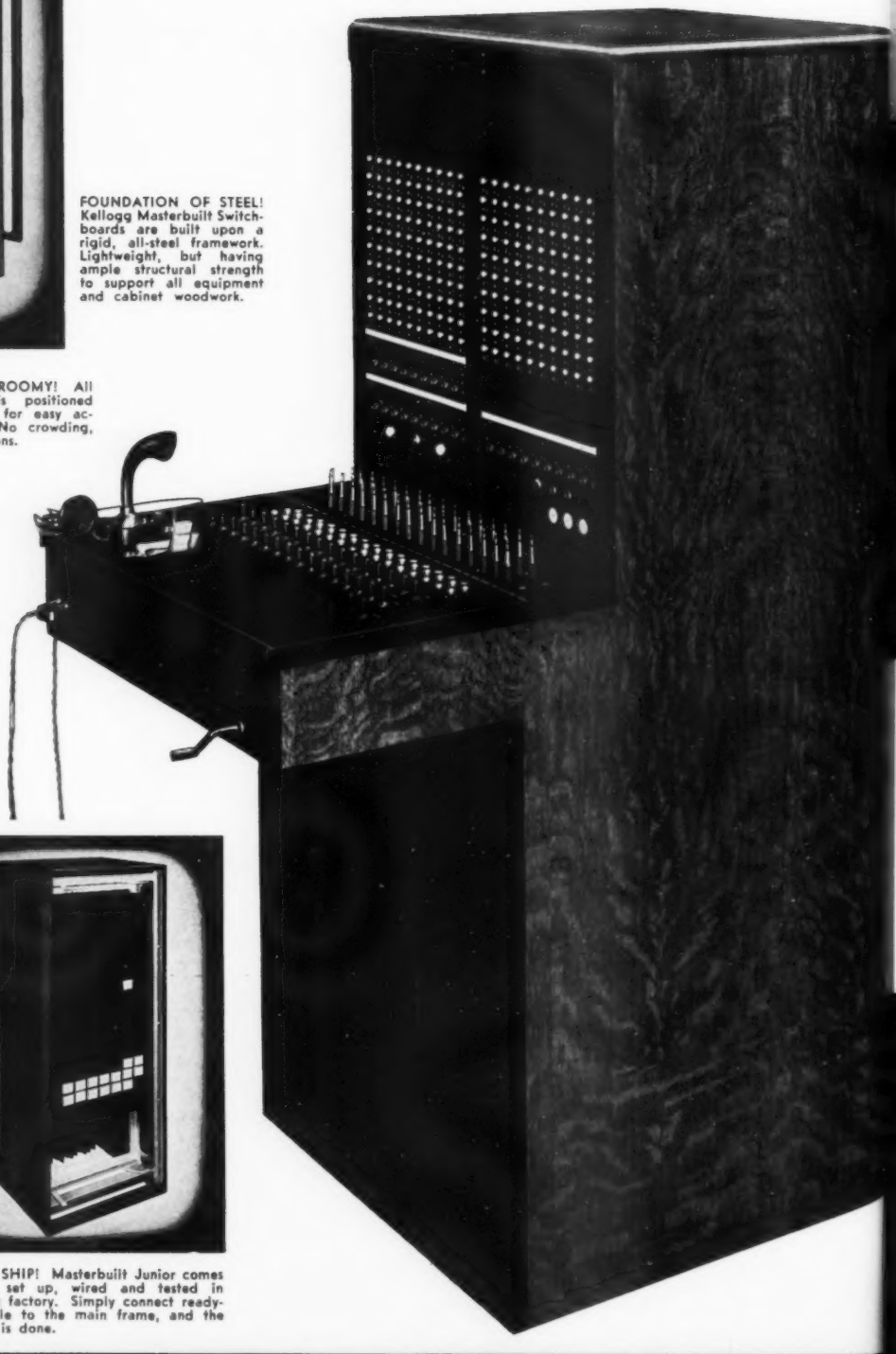
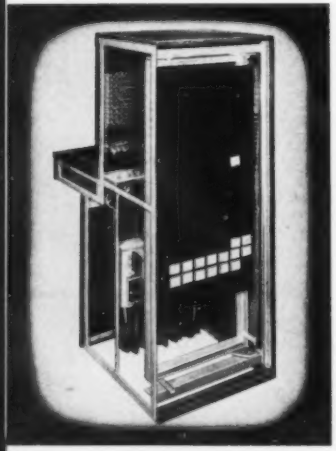


FOUNDATION OF STEEL! Kellogg Masterbuilt Switchboards are built upon a rigid, all-steel framework. Lightweight, but having ample structural strength to support all equipment and cabinet woodwork.

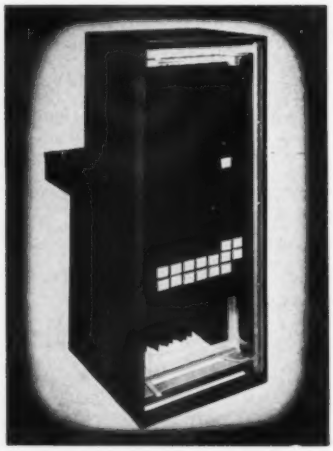


NEAT AND ROOMY! All equipment is positioned and spaced for easy accessibility. No crowding, no obstructions.





SIMPLE AND RUGGED! Typical of Kellogg design and construction, the Masterbuilt Junior assures many years of trouble-free service. Easier to operate than might be imagined, and maintenance is never a problem.



READY TO SHIP! Masterbuilt Junior comes completely set up, wired and tested in the Kellogg factory. Simply connect ready-fanned cable to the main frame, and the installation is done.

MA
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THERE ARE MORE KELLOGG MANUAL SWITCHBOARD

XUM

a MAGNETO *Exchanges!*

MASTERBUILT JUNIOR ADDS TO YOUR PROFITS, CUTS DOWN YOUR EXPENSES, PROTECTS YOUR INVESTMENT.

BECAUSE the Masterbuilt Junior is priced in the magneto switchboard class, it opens new profit opportunities to the small exchange owner. It is as easy to buy as an ordinary magneto board, but provides many additional advantages.

With it, you can cut down your operating costs and provide your subscribers with "big city" service which is faster, more dependable and more valuable, and increase your revenue and earnings. All of this can be accomplished with your present subscribers!

Hundreds of other exchange owners have found that most subscribers will gladly pay more for the extra convenience and reliability of common battery service. With the Masterbuilt Junior you can continue to furnish magneto service at present rates to those who still want it. And magneto lines can be changed to common battery at any time by simply changing two easy connections on the relay gate. This incurs no additional switchboard expense, but you immediately increase earnings and decrease operating costs. Talking and ringing current, for example, can be furnished for as little as 10 cents per year for each common battery station! Compare this one item alone, and the savings it affords you, with your present cost of furnishing dry cells.

The Masterbuilt Junior will prove equally interesting from the standpoint of a safe investment, improved operator efficiency, better subscriber relations and the contribution it makes toward the progress of the town. Your Kellogg representative, without obligation to you, will gladly discuss the advantages and economies of this equipment in more detail.

Low Cost

SIMPLE TO OPERATE
EASY TO MAINTAIN!

KELLOGG
SWITCHBOARD AND SUPPLY COMPANY
6650 South Cicero Avenue • Chicago

Masterbuilt *Junior*

RD

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Helping to Humanize the Telephone

The advertisement on the opposite page calls attention to the human values of telephone service. It appears in women's magazines during December and January. It is a good-natured reminder of the telephone's place in daily life.

These advertisements should help to build an appreciation of the usefulness of the telephone and a reliance on telephone service everywhere.

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AN ADVERTISEMENT OF THE BELL TELEPHONE SYSTEM

Wasn't it fun when I telephoned Betty all by myself like a grown-up lady?

It was—and it's just the beginning, Janey. I can hardly wait for all the fun I'm going to give you as you grow up! By the time you're in your teens, I'll be busy all the time, with news of school and homework and clubs—

How exciting! Go on—

And luncheons and lots of the gay good times you plan on the spur of the moment. Oh, Janey, your mother was right when she said she wouldn't dream of bringing up a daughter without a telephone in the house!

You know what?—when I have my own home, you'll be the first thing in it! Unless—do you cost very much?

No, that's the wonderful part! I cost so little that your mother says she couldn't possibly afford to do without me!

BELL TELEPHONE SYSTEM

XUM

May the Sands of 1941
be full of "Pay Dirt" for You

It is our wish, here at "National," that each hour of the year, 1941, will bring to you an increase in successful accomplishment. And that the year as a whole will see the end of world strife and the beginning of everlasting peace.

THE NATIONAL TELEPHONE SUPPLY COMPANY

Subscriber Satisfaction Means Profits

Get Rid of Noise!

with the

New Improved RTC-2 VINCENT

RARE GAS RELAY

- *Installed in a Minute*
- *No Moving Parts*
- *Thousands in Service*
- *Fully Guaranteed*

Eliminates unbalance noises in metallic party lines employing divided ringing to ground. Works with either harmonic or code ringing.

• • •

Write for Catalog 39-A describing

Non-Grounding
Rare Gas Arresters
Terminal Strips
Potheads *Housings*

L. S. BRACH Mfg. Corp.
55-63 Dickerson St. Newark, N. J.
Signal Circuit Engineers Since 1906

Telephony

The Journal of the Telephone Industry

Vol. 120 JANUARY 4, 1941 No. 1

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—●—

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New Year Thoughts

IT IS MORE than likely that the old custom of making New Year resolutions is dying out. At least we don't hear so much about them as we used to when it was a shop-worn joke that they were very short-lived. Still, as in many other customs of the horse-and-buggy age, there was a germ of merit in the idea of "turning over a new leaf" on January 1. At least, it showed a momentary impulse to do better, to forsake bad habits and cultivate good ones.

The New Year finds the United States entering on an absorbingly interesting period. We are in the midst of the selective service—the draft—which will take more and more of our young men out of business and college life, and switch them into military training. Likewise, as the national defense program is enlarged, more and more of our industrial energies will be diverted from normal activities into production for war purposes.

It doesn't require much foresight to see both good and less fortunate results from these developments. The speeding up and enlargement of war production will reduce the unemployment that has plagued the country for ten years. It takes more men and more materials to turn out more airplanes, guns and all the other munitions of war that the increased army will need, as well as clothing, food and various other supplies those soldiers must have.

That means jobs—but also means higher taxes and a larger national debt, which may be listed as among the less favorable results of a big defense program. Besides, long-range thinkers are already worrying about what the drafted men and the factory workers will do when war preparations are over, and we are back to normal. But that is not a 1941 worry.

Today the country is intent on the plan to make the United States so impregnably strong that, regardless of the outcome of the European war, no aggressor nation will venture to pull a feather out of the American eagle. Citizens of this country have more to protect than any other people on earth—freedom and the American way of life. We may have to surrender —temporarily—some of our privileges and some of our liberties to preserve that American way of life, but every one of us should be convinced it is well worth every necessary sacrifice.

Two weeks ago TELEPHONY contained a page entitled "Appreciate America," emphasizing that thought as an appropriate Christmas greeting. It is a slogan that should be followed throughout the whole year. As a New Year resolution it provides a genuine rallying point for every loyal man, woman and child in the United States—"Appreciate America."

"Today we live in a world of unknown future," said this declaration. "Race hatred and religious intolerance now sweep the dictator countries of Europe. Their hysterical hymn of hate will fall upon deaf ears if we but teach our children—tomorrow's citizens—to love one another regardless of race or creed. America will not suffer the poison of intolerance. Our churches will not be closed. Our right to worship as we see fit will not be denied us. Freedom of speech, and freedom of thought are inalienable rights of every American. Appreciate America as a nation of religious liberty, the land of the free."

Generally speaking, the telephone industry faces the New Year in a much more hopeful frame of mind. Of course, telephone men share in the uncertainty due to conditions abroad, but the last year saw station losses regained in most localities and public recognition of the indispensability of telephone service more emphatic than ever before. In short, the industry is in a healthy condition ready and willing to extend its usefulness wherever needed.

A timely suggestion is made to operating companies in the telephone field that it will be wise for them to get their orders in for equipment and supplies needed in the next six months without further delay. Most of the manufacturers and supply dealers have received—and expect to receive—government orders covering national defense materials that may take precedence over other business if conditions demand it. If this priority rule is enforced, private buyers will have to wait their turn.

Many manufacturers have foreseen this contingency and have increased their stocks so they can take care of their customers as they make known their requirements. At the same time wise buyers will send in their orders now for future delivery, and thereby guard against developments that may complicate the situation by delaying production of non-war materials. Prices, of course, would be affected by a halt in such production.

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INFLUENCE OF DEFENSE FOUND

In 1940 Resume of Industry

***INCREASING ORDERS** for telephone manufacturers and mounting station gains for operating companies are attributed in no small part to the National Defense Program. A look back over happenings during the past year indicates that 1941 will be busy for all branches of telephone industry*

IN CONSIDERING developments in the telephone industry during 1940, probably the most outstanding single factor affecting both manufacturing and operating fields was the national defense preparations. Considerable pending construction by telephone companies was advanced ahead of schedule, while the manufacturing companies enlarged plants and speeded up production to fill government orders in addition to equipment orders from the telephone field.

While the year brought regained telephones to most of the larger telephone companies, many small exchanges still find themselves behind a normal gain considering improved business conditions.

The manufacturers report that business was good, and they start the new year with an avalanche of new orders which will be handled as rapidly as possible. Most of the manufacturers have been furnishing communication equipment to various governmental branches during normal times, and now they are called upon for larger shipments under the expanding defense program.

Many cities and towns, in which Independent operating companies are located, feel the effect of the defense plans for there are expansions of their customers' plants and the building of many new plants for the purpose of furnishing material to the government. These new plants and expanded facilities of present plants call for additional communication facilities, which have to be furnished by local telephone companies. In turn, the companies find it necessary to purchase more equipment from manufacturers to meet service demands.

The manufacturers are endeavoring to keep up with these orders for more and more equipment, from both the government and the telephone field, but since the defense program calls for a great deal of material the future may overtax the facilities of the plants to meet the demand. New additions to factories are being made in many instances.

The government has the authority to require that its orders be given precedence in order to speed up the defense program, therefore telephone companies should bear this in mind when ordering equipment. Material should be ordered as far in advance of being actually needed as possible, to avoid delays and disappointments.

Telephones Total Nearly 22 Million

As the year drew to a close, substantial telephone gains recorded throughout the Independent and Bell fields bring the total number in service close to the 22 million mark. This compares with approximately 20,820,000 at the end of 1939.

The Independents at the end of 1940 had an estimated 4,510,000 telephones in service, as compared with 4,285,000 for 1939, a gain of 225,000. The number of telephones in service in the Bell System is expected to show an increase for the year of about 940,000 and will thereby reach a new high of more than 17,460,000. This gain is the largest ever recorded in a single year. The gain in 1939 was 775,000. The total estimated telephones in service at the end of 1940 was 21,970,000.

Telephone conversations mounted during the year. Throughout the industry, about 95,300,000 messages were being made every day in this country, according to estimates for the first six months of 1940. This total is an increase of about 3,500,000, or nearly 4 per cent, over the corresponding average daily volume of completed calls being made the previous six months.

The average number of Bell telephone calls per day in 1940 was 78,700,000, or nearly 5,000,000 more per day than in 1939. Completed toll calls in 1940 totaled about 900,000,000, exceeding the 1939 figure by more than 40,000,000.

The gross construction outlay for plant in the Bell System during 1940 amounted to $380,000,000, as compared with $320,000,000 in 1939 — a 60-million-dollar increase. The nation's defense program accounted for much of this increase. The 1939 figure was an increase of 37 million dollars over 1938. The largest amount ever expended by the Bell System in any one year was $633,000,000 during the peak construction year of 1929. The smallest was $164,000,000 during 1933, in the middle of the depression.

During the year bond issues were made by several telephone companies, but the most notable transaction was in November when the American Telephone & Telegraph Co. sold privately a huge bond issue of $140,000,000 of 2¾ per cent debentures due in 30 years, at 98½.

Rural and Other Activities in Telephone Field

Turning to other activities in the telephone field, the improvement of rural telephone service continued to be a most important topic. The programs at state conventions gave attention to this matter, and many telephone companies carried on large construction programs in order to furnish better and more modern service to their subscribers.

There is no question that rural subscribers remain a problem of the telephone industry. In some communities there is an awakening among the farmers themselves, and it is hoped the future will bring an improved telephone service which they will genuinely value as a necessity for profitable farming, instead of only a luxury or a convenience that can be dispensed with during economic stress.

An expansive telephone improve-

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ment program for Tennessee was announced by the Southern Bell Telephone & Telegraph Co. last March, with the approval of the state commission. Of an estimated $25,000,000 proposed expenditure, about $6,000,000 was to be used for improving rural telephone service in the state. The Southern Bell lost no time in inaugurating this special program for streamlining rural telephone service and is working directly with the farmers through a special representative.

The FCC recommendations contained in the final report of the telephone investigation got little further than the front door of Congress, and the situation is still status quo.

An increased accrual to the Bell System pension fund of $6,500,000 for 1940 was authorized in December by the FCC, making the total accrual for the year $20,000,000 compared with $13,500,000 for 1939.

Long distance telephone rate reductions totaling nearly 5½ million dollars a year were made May 1 by the American Telephone & Telegraph Co. following agreement with the Federal Communications Commission. Many associated companies in the Bell System reduced toll rates in comparative degree, following negotiations with the FCC.

Attention was given by telephone men during the year to methods of selling the telephone, and the feeling seems to be spreading that a definite change or procedure should be adopted which will carry a stronger selling appeal to the modern world.

Defense activity throughout the nation was reflected in discussions of telephone men at conventions and district meetings. Communication plays an important part in the nation's welfare and the telephone industry recognizes its vital position in the defense program. Necessary precautions were taken to safeguard telephone facilities from possible sabotage.

The conventions of state associations were well-attended, and brought many new faces to the meetings. Many of these were young men new in the industry who desire to learn more about their business and to become acquainted with their fellow-workers.

An interesting personnel angle is that the average age of Bell employes increased 9½ years because of few new employes being taken on during the depression. In the Independent field, the majority of managers are over 50 years of age.

The Bell System reports the quality of its service was generally maintained at a high level, and in certain respects improved. In connection with this, adequate training of new employes was essential. Additions to the force in 1940 were the largest since 1937.

NOTICE

At the time of the sudden death of Stanley R. Edwards, editor of TELEPHONY, *he had been working on the "Annual Review of the Telephone Industry" which he had prepared for many years in the past. From the notes he had collected, the review has been assembled and completed by his assistant, Miss Ruby Riley.*

For their helpful assistance, gratitude is expressed to the American Telephone & Telegraph Co., the International Telephone & Telegraph Co., Automatic Electric Company, Kellogg Switchboard & Supply Co., Leich Electric Co., Stromberg-Carlson Telephone Mfg. Co., and the United States Independent Telephone Association.

Bell Prepared to Meet Defense Requirements

National defense considerations greatly influenced the course of events in 1940 for the Bell. Much pending construction was advanced ahead of schedule. Prudent measures were taken to safeguard telephone facilities. The establishment of alternate toll routes, which has already done so much to improve the dependability of toll service, was given further impetus.

The Bell Laboratories and Western Electric exerted themselves to supply the special needs of the military services. Operating companies of the system likewise cooperated with the military to provide all desired facilities in war game areas, at camps, air fields, arsenals and munitions plants. Where the need lay in the future, rather than in the present, plans were made to increase circuit capacity along important routes and to assure adequate circuits, equipment and personnel at points where there might be unusual service demands.

Concurrently, there was a general expansion of activity in all departments to meet the country's increasing demand for service and to prepare for additional demands in the near future.

In general, the Bell System feels that its facilities, resources and organization make it well prepared to do its part in the nation's program for national defense. Appropriate messages to the public have stated this readiness to serve.

National Association Watchful for Independents

A vigilant attitude has been maintained throughout the year by the United States Independent Telephone Association to protect the Independent companies from harmful legislation or from any other activity that might have a detrimental effect upon the industry.

An amendment to the Wage-Hour Law secured the previous year, whereby operators in small exchanges having 500 stations are exempt, furnished some relief. The national association continued its efforts to obtain further benefit for the Independent industry, with reasonable success.

A learning period of 320 hours or approximately eight weeks, at a subminimum rate of 25 cents per hour, was permitted by the Wage-Hour Administration in order to prevent curtailment of opportunities for employment of telephone operators in the Independent branch of the telephone industry.

The wage-hour committee of the national association, under the capable chairmanship of John H. Agee, Lincoln, Neb., was active in securing a re-definition of the term "executive or administrative"—the Wage-Hour Administration's decision being a modification of its previous ruling.

Early in the year the association employed William Bruckart as its Washington representative. Mr. Bruckart died very suddenly on August 1; and on November 1, the association employed Clyde S. Bailey to have charge of its affairs in Washington.

In securing the services of Mr. Bailey, the association feels that it has an able representative. For 20 years he had been associated with the National Association of Railroad and Utilities Commissioners, being secretary and assistant general counsel the latter part of the period. Washington office headquarters have been set up at 1292 National Press Building.

During the year the national association issued a bronze membership plate to all of its members.

Through the activity of its toll compensation committee, which is headed by Edwin M. Blakeslee of the Commonwealth Telephone Co. of Madison, Wis., new contracts were offered by many of the Associated

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Bell companies to connecting Independent companies, which give to the Independents a larger portion of the tolls they originate.

Mr. Blakeslee, in his report to the convention in October, stated that recent increases to Independents amounted to approximately $850,000 annually, an increase of about 7½ per cent. The contracts have also been simplified to a considerable extent.

Considerable attention is being given by the association to the proposal to break down the present FCC "A" classification of telephone companies, which now provides for one system of accounting for companies having annual operating revenues from $100,000 to in excess of $200,000,000 into two groups, "A" and "AA"—"A" companies to be those with operating revenues from $100,000 to $8,000,000 and "AA", $8,000,000 up.

The annual National Independent convention October 15, 16, 17, 18 at the Stevens Hotel was the largest ever held by the association in every respect.

Through its National Defense Coordinating Committee the association is actively cooperating with the government. President Carl D. Brorein has been appointed a member of the government's Industry Advisory Committee (which is the top committee under the Defense Communications Board) and Executive Vice-President Louis Pitcher has been appointed as the representative of the association on the Domestice Broadcasting Committee and on the Telephone Advisory Committee, with Mr. Bailey as alternate.

(The Bell industry is represented on the Industry Advisory Committee by W. S. Gifford, president of the American Telephone & Telegraph Co.)

Toll Compensation Case Won by Independent

Among the notable successes in the telephone industry during 1940 was the compensation toll case won by the Jamestown (N. Y.) Telephone Corp. over the New York Telephone Co. The case had been carried through various courts to the state's highest court—the New York Court of Appeals—with the latter upholding the decision of a lower court in favor of the Jamestown company.

This is the first case involving toll compensation that has been won by an Independent telephone company. Compensation for handling the toll business for the New York Bell company was insufficient, claimed the Independent. A new contract tendered by the Independent company was refused by the Bell company. The Jamestown company, in remitting to the Bell, deducted what it considered a fair and reasonable compensation for handling the toll business. The Bell brought suit for an amount based upon its original contract, contending the contract had not been legally cancelled.

The case went to court where a decision was issued holding the Independent company contract was legally terminated. Appeals were then taken through various courts by the New York Telephone Co. until the final decision was handed down in favor of the Jamestown company. The appeals court decision was an unanimous one of the five judges participating.

The result of the Jamestown case, it is believed, led to the action of several of the Bell associated companies in increasing their toll compensation to Independent connecting companies. A more liberal division of the toll revenues between the Bell and its Independent partners in toll business was one of the favorable developments of the year.

FCC Plans New Regulation Department

The Federal Communications Commission, at the end of the year, was reported to be preparing to add 54 employes in a new unit for regulation of telephone companies. They will be mainly professionally and technically-trained persons, including telephone engineers, accountants and lawyers, with a small number of clerks and stenographers to be added.

The funds for starting the regulatory unit were recently provided by Congress when it allowed $125,000 for eight months. Some FCC members hope more funds will be made available to permit a more complete job of regulation.

Wire-Tapping Investigation Ordered by Senate

Early in the year a resolution was proposed by Senator Theo. F. Green (Dem., R. I.) providing for an investigation of the use of wire-tapping and dictaphones by law-enforcement agencies. This was ordered by the U. S. Senate on March 20, to be conducted by the Senate interstate commerce committee.

Hearings in this inquiry commenced November 18 under Senator Stewart of Tennessee, but as the year ended little had been developed. The case seems to have started over some petty charges and cross charges of a purely political nature. The position of the telephone industry has not been compromised by any of the testimony so far.

Certain Senate leaders interested in this wire-tapping inquiry have let it be known that they intend to extend the investigation to the new session of Congress and are making plans to ask for a minimum appropriation of $50,000 to broaden the scope of the probe.

New Devices Brought Out During Year

In addition to the various developments and equipment improvements of the larger manufacturers (reported on other pages), three entirely different devices were introduced to the telephone field—the Audograph, the Peatrophone and the Tele-Spot.

The Audograph, brought out early in 1940 by the Gray Manufacturing Co., Hartford, Conn., is an electrical recording machine which employs microphones and loudspeakers to make recordings. It will record the speech of both parties in a telephone conversation without physical attachments to the telephone equipment. The 12-inch disk will provide 16 minutes of recording time, and may be filed or mailed like a letter.

The Peatrophone, produced by the Peatrophone Corp., New York, N. Y., is an instrument which answers the telephone automatically, in the absence of the subscriber and will "speak" any message which he may wish to give to calling parties. In addition, the new telephone auxiliary permits callers to record any messages they may have for the subscribers.

Essentially, the device consists of a large and a small phonograph disk, with a speaking head and a recording head, together with an arm for operating the telephone hookswitch, a microphone to pick up sound emanating from the telephone receiver, and a small loudspeaker which speaks into the telephone transmitter.

The Tele-Spot, developed by Telkor, Inc., Elyria, Ohio, is a vacuum tube test instrument intended to quickly and accurately locate faults on aerial telephone or telegraph lines and in underground cable. This device will locate aerial line faults to within a few inches, it is claimed, without the necessity of climbing poles or leaving the ground; and it will also determine the location of buried cable or of gas and water pipes. It can trace the course of a pipe or cable with great accuracy and locate wiring concealed in building walls.

The Tele-Spot should be useful not only to telephone companies but also

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to telegraph companies, power companies, electrical contractors and municipalities. Excavating contractors, it is pointed out, will find the instrument of value in locating hidden pipe lines, to avoid damage to them by the excavating equipment.

"Telephone Blockade" Used by Labor Agitators

Of concern to the telephone industry during the year was the action of certain labor agitators in practicing the "telephone blockade" when they wished to bring pressure to bear on certain firms. The object was for the strikers to repeatedly call a firm by telephone, thus keeping the wires so busy customers were unable to get calls through. Incidents were experienced in New York City, at a credit clearing house, in Kansas City at a laundry, and in Wichita, Kans., laundries.

In the Kansas City case, striking employes of the laundry company kept four telephones ringing incessantly for nine days, the calls totaling from 12 to 16 a minute. The owners went to court, obtained restraining orders which were served on two labor organizations and 12 labor officials; the telephones ceased ringing and regular customers could again place orders.

In the Wichita case former employes of nine laundries tied up telephone service with fake calls, until court injunctions were obtained restraining them from continuing the several-weeks-old blockade.

The "telephone blockade," in addition to threatening business, bore a definite threat to the good will and public relations of the telephone industry if it had been permitted to spread.

The Southwestern Bell Telephone Co. and the Lincoln (Neb.) Telephone & Telegraph Co. secured commission approval of a rule whereby they could discontinue the service of any subscriber who uses it to interfere with the services of other subscribers, or other than as a means of communication.

New Subscribers Welcomed by Telephone

There was a tendency in the field for telephone companies to broaden services to create satisfied customers and to build up public relations. One example was the inauguration of a plan by the Lincoln (Neb.) Telephone & Telegraph Co. to welcome new subscribers over the telephone.

In addition to creating a pleasant impression, this plan of telephoning new subscribers sometimes reveals that another type of service would be more suitable. Also, service complaints are occasionally received in this manner which are reported promptly to the plant department. When the service is reported in good order, the subscriber is again called by the "Welcome" clerk to make sure that he is completely happy. The pleasing telephone personality of the company employe wins many friends for the company.

FRONT COVER

One of the great events in man's march of progress is illustrated in our cover photograph this week. It shows the first flight in a motor-driven heavier-than-air craft, made by the Wright brothers on December 17, 1903, at Kitty Hawk, N. C.

Orville and Wilbur Wright were the proprietors of a bicycle shop in Dayton, Ohio. Their continuing experiments with flying machines led them to the flat Carolina coast, where the historic first flight was made. One of the Wright brothers may be seen in the picture, lying flat on the lower wing.

The plane which made this first flight only 37 years ago was indeed a crude affair. Two propellors were driven by chain belts from a small motor; the construction of the entire craft was incredibly flimsy, as judged by modern standards.

A comparison of the Wright brothers' crude ship with the great silver airliners of today, which span continents in the space of a few hours, emphasizes the almost unbelievable advances which can be made by scientists and inventors, under a democratic system of free and unfettered enterprise.

Shut-In Pupils Go to Classes by Telephone

In Iowa a leased wire hook-up between schools and the homes of shut-in pupils permits them to "go to school" despite physical afflictions, such as heart disease, limbs withered by infantile paralysis, or bones broken by accidents. The Iowa Superintendent of Public Instruction has installed the telephone intercommunicating system in about a dozen districts; the state provides the equipment and the school district pays the telephone tolls.

The box-like instrument at school is carried from room to room as classes change, a special plug providing the connection in each room. In the child's room at home is a similar device. The shut-in child not only hears everything that goes on in the classroom; he also "recites" when called upon. One such shut-in was elected president of his class.

The voices of whole classes, and the teachers as well, have benefited by the use of the devices. They learn to speak distinctly and not too loud, thus developing desirable speech habits that will stay with them the rest of their lives, points out the state superintendent.

High Court Upholds Labor Board's Jurisdiction

A few companies in the telephone field were confronted with labor difficulties during the year, among which were the Lincoln (Neb.) Telephone & Telegraph Co., the Northern Ohio Telephone Co., Bellevue, and the Central Missouri Telephone Co., Warrensburg. All companies presented testimony to support their contentions that they had not interfered with union organization among employes. However, reports of the National Labor Relations Board's examiner recommended action not in their favor and appeals were filed by the companies.

A decision was issued in late November in the Central Missouri case whereby the United States Circuit Court of Appeals for the eighth circuit upheld the jurisdiction of the NLRB over industrial disputes of telephone companies.

The Central Missouri company's own physical operations are confined to the state, although it effects transmission of interstate or long distance telephone messages to and from points served by it through connecting lines to those of interstate telephone companies. The fact that only a small part of its activities are connected with interstate commerce was held in the court decision, not to be material, and the company, therefore, is ruled under the jurisdiction of the NLRB.

Toll Rates Undergo Change in Several States

In the state of Washington hearings were begun in February by the Federal Communications Commission on interstate toll rates of the Pacific Telephone & Telegraph Co. Following considerable testimony, the FCC issued a proposed order August 14 under which the Pacific Bell should make effective in Pacific territory the interstate rates published for east and west toll traffic by the A. T. & T. Co. under the $12,000,000 reduction effected January 15, 1937, and the subsequent $5,000,000 reduction of May 1, 1940.

The FCC announced April 6 that reduced tariff schedules for interstate message toll rates had been filed by the Diamond State Telephone Co., the New Jersey Bell Telephone

(Please turn to page 28)

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ACHIEVING and maintaining a high standard of telephone service is possible only through constant research and cooperative endeavor. The developments during 1940 in one group in the telephone industry are presented in this

Summary of the Bell System's Technical Progress

TECHNICAL progress in the Bell group of the telephone industry records many developments and improvements during the year 1940. Continuous research and experiment are carried on with a view to improving existing equipment, apparatus and facilities for bettering telephone service, local and toll.

The telephone industry is a vast enterprise, and telephone service in the United States is of the highest quality in any country. This is possible only through constant research and effort by the telephone industry, as a whole.

The Bell System reports service improvements and many activities of a technical nature in which progress has been recorded, and discussions covering them appear on the following pages.

Toll Plant Extensions

To meet the increased traffic resulting from the faster tempo of business, about 500,000 circuit miles were added in 1940 for long-haul toll service. About two-thirds of this mileage was provided by voice frequency facilities and the older types of carrier systems; about one-third was added by means of the so-called broad band carrier systems for open wire and cable which have been developed in the last few years.

On existing two-cable routes, the broad band systems on the average increase six-fold the number of speech channels on each pair so equipped. The broad band open wire systems add 12 channels to each pair equipped, but only on newly-constructed lines can all pairs be so treated.

The use of toll cable is expanding rapidly; at the end of 1940, more than 70 per cent of all long-haul circuit mileage was in cable. The toll cable network now extends over the northeast, with branches south to Atlanta, Ga., and as far west as Omaha, Neb., and Dallas, Texas.

Plans were advanced in 1940 for the westward extension of the network from Omaha. By the end of 1941, it is expected, twin cables from Omaha to Denver will be ready for service. Part of this line will be placed in conduit, but for the most of the 600-mile distance the cables will be buried by a special plow which was developed and perfected in 1940. This plow buries both cables at once, one above the other.

The reason two small cables are being installed, instead of a single larger one, arises from the fact that the line will be arranged for "K" carrier operation. If a single cable were used, a built-in shield would be needed to prevent cross-talk between west-bound and east-bound channels. Such a two-way shielded cable is sometimes more economical, particularly where conduit additions would be required if two cables were used; but in cases where the cable is buried directly in the soil, or runs aerially, two small one-way cables are often preferable.

A good example of a project pushed ahead of schedule for reasons of national defense is the twin-cable installation between Richmond and Norfolk, Va. Normally this installation would have been made about

Plow train burying two cables at once in a single trench is pictured en route between Baltimore and Washington. The train consists usually of two diesel-powered tractors, the plow and two cable-reel trailers. Under favorable conditions, several miles of cable can be buried in a day. Where conditions require it, the same plow is used in advance of the cable-laying operation to explore obstructions; the train as shown then follows the original cut made on the exploratory trip. Normally the cables are buried to a depth of 30 inches, but the plow will go down to a depth of 48 inches when necessary, as for example when the cables must go under ditches.

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1943, but to meet the rapid expansion of activity at the naval base near Norfolk, construction is already under way and circuits are expected to be in service by the spring of 1941.

Another important new cable is one which has been installed between Baltimore and Washington. This runs underground along an entirely different route than that followed by all the direct cables previously in service between the two cities. It is placed in conduit for parts of the distance; for the rest of the way, two smaller cables were buried by the special plow mentioned previously. This was, in fact, the first use of the plow.

In the 112-mile section of the fourth transcontinental line between Amarillo, Texas, and Tucumcari, N. M., snow and ice on the open-wire lines have at times interrupted transmission over the broad band carrier channels. Two small cables arranged for "K" carrier operation, therefore, have been placed in this section.

The Stevens Point-Minneapolis coaxial cable has been completely installed and regular traffic has been handled over it. During the severe storm emergency in the northwest in November, a number of the coaxial circuits were useful in replacing damaged circuits on other routes. By the middle of 1941, approximately 50 circuits provided by the coaxial system are expected to be in operation.

The full capacity of 480 circuits will not be utilized for many years, but there will be a gradual increase in the number of channels to meet the anticipated growth of traffic. In the meantime, tests directed toward the perfection of the coaxial system for longer distances are being carried on.

Operator Dialing of Toll Calls

Further progress was made last year in applying methods whereby the operator may dial directly the number of a telephone in a distant community, instead of asking an operator there to complete the call. About 14 per cent of all toll messages in 1940 were handled in this way. Most of these were short-haul calls, handled over segregated tandem systems and other segregated short-haul toll plants not connected into the nationwide toll network.

However, in Ohio, Michigan, Virginia and West Virginia, so-called intertoll dial systems now permit the operator to dial many calls which come into the system over the general toll network. For example, on a call from New York to a town in Ohio which is connected to Columbus by a dial intertoll trunk, the Columbus operator, when the call reaches her, can dial directly the desired number in the distant town, instead of relaying the call to the local operator there.

The Ohio toll dialing network is, in fact, the largest, comprising some 265 dial intertoll trunks totaling 10,000 circuit miles. Here toll calls up to about 200 miles are being dialed by the operator. During the year, both the Ohio and Michigan Systems were arranged for operator dialing of switched calls.

Installing a 200-mile one-way cable-carrier system on roof of Bell Telephone Laboratories in New York for experimental purposes.

A 200-Mile Carrier System on a Roof

Work continues on the improvement of cable-carrier systems. Interesting evidence of this activity is supplied by the installation last year of a one-way system, 200 miles in length, on the roof of the Bell Telephone Laboratories, Inc., in New York City.

This brings a field installation to the laboratory, instead of the more usual practice of taking laboratory facilities to the field for trial. The roof cable will serve as a valuable tool in the development of toll transmission systems, signaling systems, etc. It is now being used for tests of cable-carrier improvements which are under development.

Exchange Dial Operation

During 1940, the number of Bell System telephones which were dial-operated increased about 1¼ million. Some 220,000 lines of crossbar dial central office equipment were installed. Altogether, about 350,000 telephones are now served through crossbar offices.

With completion of the work planned for 1941, all of the larger metropolitan areas will have some crossbar equipment in operation. The extension of dial service to smaller communities has continued, some 420 small exchanges having been converted from magneto to dial operation during 1940.

During the year, equipment arrangements were provided to further improve the service of communities and towns adjacent to the larger cities, including the extension of direct customer dialing between city and suburban users. Also, improvements were made to further safeguard the reliability of service, particularly in the smaller dial installations having less than 2,000 stations.

New Voice Frequency Repeater

An important development is represented by the new voice frequency telephone repeater standardized in 1940. This will be lower in cost, smaller in size, easier to maintain and more adaptable than the present voice frequency repeaters, which it will supersede for new installations. As an example of its flexibility, the new repeater may be operated on either four-wire or two-wire circuits.

This makes it possible to install a line facility which can first be op-

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erated on a four-wire basis; later, when carrier is employed for the longer circuits, the line may be changed to two-wire operation and used for the shorter circuits, without replacing the voice frequency repeaters. Also, the new repeater will work on any one of various types of power supply.

Handset Coin Telephone

After extensive field trials, a handset coin telephone has been made available for general use in the Bell System. Representing an improvement in both convenience and appearance, it incorporates the latest advances in transmission.

An important feature is the presence of a second transmitter inside the coin collector housing. This is required in order to make sure that when coins are deposited, the gong signals will be clearly heard by the operator. The talking transmitter in the handset cannot be relied on to transmit the signals clearly, because it has no rigid and close connection with the coin collector housing, and the person using the telephone may hold the handset at some distance from the collector when he deposits the coin.

In association with the new instrument, a much smaller ringer set will normally be provided, as much of the equipment previously located in the bell box has now been fitted into the coin telephone itself. This should improve the appearance of many public telephone installations.

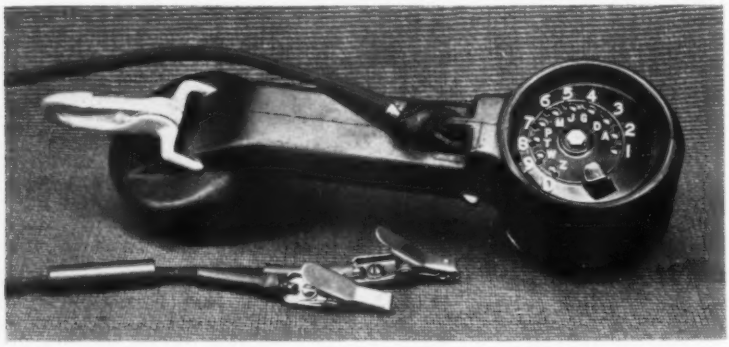
Telephone Set for Explosive Atmospheres

Another new telephone set is one which has been developed for use in places where explosive gases and vapors may be present, as in chemical plants, distilleries or refineries, and possibly in hospitals at locations where there may be explosive vapors.

The set is designed for use in Groups B, C and D of hazardous atmospheres as defined by the National Electrical Code of the National Board of Fire Underwriters. These contain gases such as hydrogen, natural or manufactured gas, or vapors of ethyl ether, gasoline, petroleum, acetone, alcohols, lacquer solvents, etc. It is not designed for "A" atmospheres, which are those containing acetylene gas.

Improved Hand Test Set

Still another improved instrument is the new hand test set. Weighing only 22 ounces, as compared with the 34-ounce weight of the set which has been in use, it represents a complete redesign of the portable telephone used by repairmen to connect to the line. The handle is of tire stock rubber, affording protection in case the set is dropped, and the dial is only two inches in diameter, compared with three inches for the standard telephone dial.



The small dial of an improved hand test set may be easily operated by inserting a pencil point in the recessions opposite the numbers.

Fluorescent Lighting for Distributing Frames

Fluorescent lighting arrangements have been made available for central office distributing frames. In view of the nature of the work carried on at distributing frames, the character of the surfaces to be lighted, and the relatively high light level desirable, it is believed that this light should be particularly effective, and the results of several trial installations have been very satisfactory.

The application of fluorescent lighting to distributing and protector frames is intended primarily for the larger offices. Plans for trials to determine its possible use in other spaces in central office buildings are now being carried forward.

Rubber Tank and Jar Batteries

Through the cooperation of battery manufacturers, enclosed rubber tank storage cells for central office batteries have been made available for use in place of the open type lead-lined wooden tank cells, and a new line of sealed rubber jar batteries has also been developed to take the place of sealed glass jar batteries.

An explosion-proof feature is an important part of both units. This will protect the cell against damage in case of accidental explosion in the cells from static discharges or short-circuit flashes.

The new tank cells cost less, save much space, and require less maintenance than the wooden tank cells. They are furnished completely assembled, filled with electrolyte, and charged, and since they are enclosed, no separate battery room is required. They have approximately twice the capacity of open tank cells in a given floor space.

The rubber jars have a 50 per cent greater capacity than glass jars in the same physical space. This is because they are molded over mandrels, and unlike glass jars, which are blown, have almost unvarying internal dimensions. Thus it is possible to increase the size and number of plates in the cell space. Both first cost and maintenance costs of the rubber cells will be somewhat below those of the glass batteries.

Neon Lamps in Station Equipment

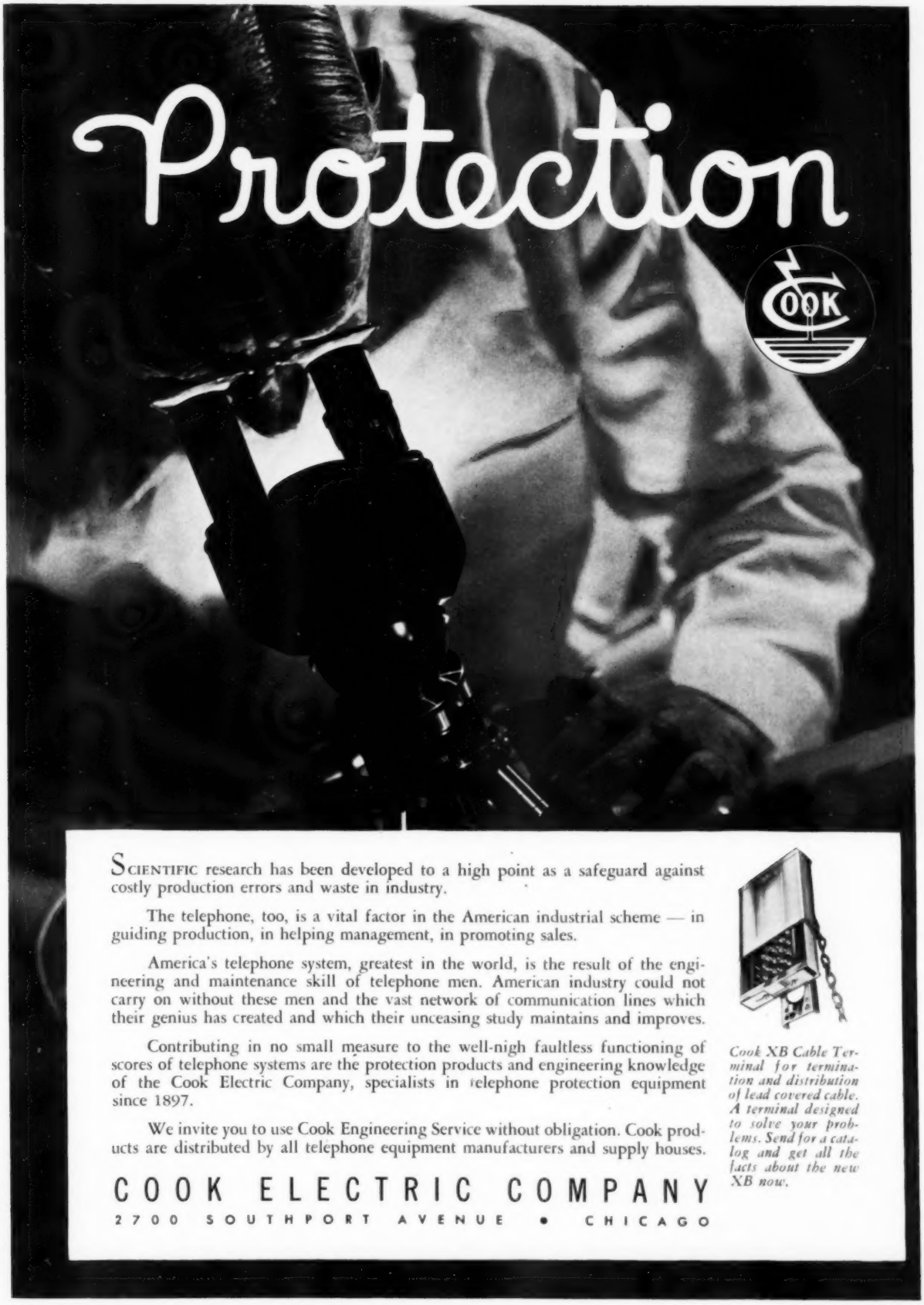
The use of cold cathode tubes, more commonly known as "Neon" lamps, is contributing toward greater simplicity and economy in certain types of telephone equipment. Recently developed, for example, is an auxiliary visual ringing signal in which a two-element tube replaces the ordinary filament lamp.

To light a filament lamp, a locally-applied source of energy is required when ringing current is applied to the line, and for this a relay which operates on ringing current is needed. To light the neon tube, however, the ringing current itself is sufficient; relay and local power supply are unnecessary.

In a similar manner, three-electrode cold cathode tubes have been employed in a new and more economical key equipment, suitable for customers who need the simplest "pick-up" type of equipment to enable an attendant to answer a number of lines at a central point. Ten-line key boxes, similar in appearance to those which have been available for many years, contain all the equipment needed, except the buzzer which provides the audible signal.

There is no need for the cabinet

(Please turn to page 30)



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NOW telephone companies a the Aut Toll Board can obtain this equipm either the standard Strowger t the high whichever they prefer.

In either case, the Remote Co Board of toll service which experience ne engi the greatest forward strides ever in toll important benefits it brings:

FASTER, BETTER TOLL S. The a few simple key operatio s or s Service is faster, better an ing tim

LESS COST PER CALL. erator h

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For Truly Modern Toll Service, You Need All These Features!

Meets latest CLR operating practices.
Maximum flexibility to meet growth and future traffic needs.
Designed to meet long distance net work dialing.
Call switching under control of finger touch keyboard.
Automatic class of service identity.
Direct display of circuit number and circuit groups.
Automatic selection of available lines and trunks.
Push button control of connection release.
Increased line and trunk efficiency.

This list represents only a brief selection of 42 important features of operation incorporated in this board. No toll board is completely modern unless it gives you all of these advantages. No matter how small or large a toll board you require, you should investigate these 42 features most carefully before making a decision. Send for this list — today!

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RMOTE CONTROL TOLL BOARD

y these outstanding advantages!

nies a the Automatic Electric Remote Control
n this equipment with switching apparatus of
wger the highly ingenious Rotor Relay type,

te Con Board offers a new and modern type
eriences ne engineers describe as being one of
les even toll practice! Here are some of the
s:

TOLL . The operator has merely to perform
peratio s or switches do all mechanical work.
tter and ing time is appreciably reduced.

CALL. rator handles a larger volume of calls, with less effort and fatigue. Operating costs per call are thus reduced.

GREATER REVENUE. With shorter connecting time per call and reduced dead holding time per circuit, existing lines can carry more traffic and bring in greater revenue.

IMPROVED TRANSMISSION. After operator completes call, talking circuit is localized within the automatic relays or switches. It is not looped to or through toll board except when operator finds it necessary to be in on circuit.

This is, of course, only the briefest summary of the improvements which this automatic method of toll operation brings — it will pay you to study its advantages in greater detail. Regardless of whether you intend to purchase new toll equipment soon or not, we should like to send you technical literature describing this highly important new toll development. Write for this information — today!

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Here and There in the Field

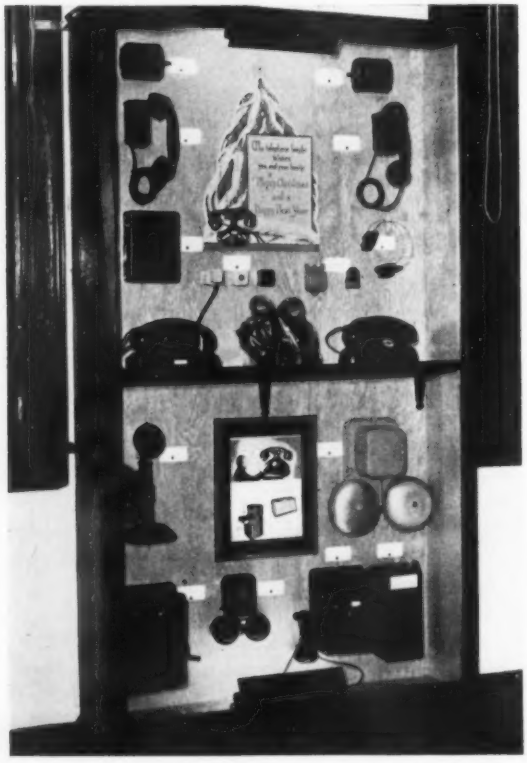
Lobby Equipment Display Is "Sales Builder"

An inexpensive permanent display case illustrating the types of telephone equipment available to subscribers has helped increase sales at the Dothan (Ala.) exchange of the Standard Telephone & Telegraph Co.

The display case, which is illuminated and equipped with a glass front, is finished to match the office woodwork. It was placed in the lobby of the business office in the Dothan exchange. Although it cost only $20 and has been in use but a month, it has already paid for itself in direct sales revenue, according to General Manager G. R. McKelvey.

"We notice that almost every customer coming into our office stops to look at this exhibit, and many ask questions," says Mr. McKelvey. "Our business office people use this case extensively in outlining the uses of various types of equipment. We feel that we have long been overlooking a fine sales opportunity by not having a permanent display of this kind."

Other telephone companies may find an attractive but inexpensive case, such as the one used by the Standard company and shown in the photograph, to be a real revenue-booster.



A permanent display of telephone equipment has been an important sales builder in the Dothan (Ala.) office of the Standard Telephone & Telegraph Co. Nearly every customer entering the office is attracted by the interesting exhibit.

New York Bell Sets New Telephone Peak

The New York Telephone Co. gained 7,210 telephones in November, bringing the cumulative gain for the first 11 months of 1940 to 80,068 instruments. In November, 1939, the company had a gain of 7,069 stations.

A new high total of 2,697,910 telephones served in New York state and Greenwich, Conn., by the New York Telephone Co. was reached in the week ended November 30, according to figures tabulated December 4. The previous peak of 2,696,603, recorded in January, 1930, was thus overtaken and passed after nearly 11 years.

In the intervening depression period, the number of company telephones in service had at one time declined by 415,853 to a low of 2,280,750. This was reported in August, 1935.

Of the present total in service, about 1,432,000 are residence telephones and 1,266,000 are business telephones. Residences telephones compare with a high record of 1,454,960, in January, 1930. However, the former peak of 1,244,450 business telephones, recorded in June, 1930, was exceeded in March, 1940, with 1,245,793.

As early as June, 1938, company telephones outside of New York City, totaling 915,653, exceeded their former high record of 911,457 in July, 1931. The gain in company telephones in recent years has been proportionately greater elsewhere in the state than in New York City, where the present total of 1,705,898 telephones compares with a peak of 1,812,587, in January, 1930, and a low of 1,467,842 in August, 1935.

During the 11-year period approximately 6,500,000 subscribers' telephones were ordered disconnected and an equal number connected. A substantial portion of this activity was accounted for by subscribers moving from one location to another.

To care for growth and shifts in both industrial and residential population and to provide for betterments and improvements in both the local and toll service, a gross of $579,000,000 was expended by the New York Telephone Co. during the almost eleven-year period for plant construction, while plant amounting to $454,000,000, which was worn-out, obsolete, or for other reasons no longer useful, was retired.

United Utilities, Inc., Declares Special Dividend

The regular semi-annual dividend of 10 cents a share and a special dividend of 10 cents have been declared by the directors of United Utilities, Inc. This brings the total payments of the year to 30 cents a share, according to an announcement by President Alden L. Hart, Abilene, Kans.

Retirement of a substantial amount of the company's outstanding debentures was also authorized by the directors. The funds were obtained from the sale of properties, notably holdings in Southern Nebraska Power Co. The company's outstanding securities on January 1, 1941, amounted to $761,000, compared with $1,365,200 at the time of reorganization on January 3, 1939.

The company's cash position has shown material improvement, Mr. Hart stated. In addition to a working capital of about $160,000, there has been set aside sufficient reserves to provide for all reorganization expenses, and still have about $70,000, which will probably be applied toward the further reduction of the funded debt.

Pacific T. & T. Reports Large Station Gain

A gain of 12,232 stations during the month of November is reported by the Pacific Telephone & Telegraph Co., compared with a gain of 9,837 telephones in November, 1939. The November gain, due partly to increased national defense activity on the west coast was the largest for that month in any recent year with the exception of 1936.

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Companies in Foreign Countries

Have Record Telephone Gain

THE TELEPHONE subsidiaries of the International Telephone & Telegraph Corp., operating in ten foreign countries gained during 1940 the largest number of telephones in any one year in its history, obtaining a net increase estimated to be more than 87,000 telephones as compared with a gain of 73,532 in 1939. This gain brings the total number of telephones operated by the I. T. & T. to more than 1,200,000 stations, which is a record in the history of the company.

The return of the Spanish Telephone Co. to the management of the International corporation, which obtained an estimated gain of over 33,000 telephones during the year, was one of the principle constituents of the increase for 1940. A gain of over 24,000 telephones by the United River Plate Telephone Co. in Argentina was also a large contributing factor to the total number gained for the year.

Increased Long-Distance Telephone Usage

A substantial increase in long-distance telephone traffic in the territories of the telephone companies of the International corporation continued as in former years. Preliminary reports indicate that an increase of slightly more than 8 per cent in the number of long-distance calls handled will be made for the I. T. & T. system as a whole as compared with the previous year.

Excluding the data of the Spanish Telephone Co., for which comparative figures are not available, a compilation of the preliminary information received shows that about 33,000,000 toll calls will have been handled in the I. T. & T. System companies during 1940 as compared with 30,400,000 recorded for 1939.

Radio Telephone Service; Ship-to-Shore Service

Radiotelephone service was extended from La Paz, Bolivia, to North America through the corporation's facilities at Buenos Aires and their connection with the American Telephone & Telegraph Co. This service was opened on April 5, 1940, giving the first telephone service from La Paz to North America.

The Compania Telefonica Nacional de Espana, a subsidiary of the International T. & T. Corp., resumed international radiotelephone service from their stations outside of Madrid in September, 1940. International radiotelephone service had been suspended in 1936. A direct circuit was opened with the A. T. & T. Co. in New York, giving service to North America which had previously been routed through either Paris, Berlin or London.

Service was reestablished with Venezuela, Brazil and the Argentine as terminal points for switching service to other South American countries. Through the radiotelephone circuits thus established by the Compania Telefonica Nacional de Espana, service was extended to Portugal.

In December, 1940, Compania Internacional de Radio Argentina established direct radiotelephone communications with Berne, Switzerland.

Due to the large volume of traffic being handled by the Argentine and North America, Compania Internacional de Radio Argentina purchased and installed during December, the latest single side-band equipment for its radio service.

Ship-to-shore telephone service was extended during the year by the companies in Argentina and Chile.

Construction Program

Steady expansion of the facilities of the I. T. & T. telephone companies continued during 1940 with approximately 60,000 new subscribers' lines being installed, together with the central office terminal, switching, power and various other associated equipment necessary to partially meet growth requirements. At the turn of the year the companies had a substantial number of orders for telephone service on hand.

Seventy-five Per Cent Automatic

The majority of the new lines installed were for automatic operation in accordance with the International company's policy of offering the most modern telephone service. Approximately 75 per cent of all the telephones in the I. T. & T. System are now operated automatically. During last year the towns of Necochea, Olavaria, and Wilde in the Argentine and Holguin in Cuba were converted to automatic service. Extensions of automatic service in the areas partially operated by manual telephone service in most of the principal cities in the system were also made.

Outside Plant Additions

Along with the central office equipment additions, extensions were required during 1940 in the outside plant to meet the increasing demands for service.

The long-distance underground cable which was installed in Rumania between Bucharest and Ploesti in 1939, and which was the first long-distance underground cable placed in Rumania, was extended in 1940 eastward to Buzau and westward to Brasov close to the present Russian and Hungarian borders.

The following aerial long-distance circuits were also constructed during 1940: Lines from Colima to Manzanillo in Mexico, from Santa Maria to Sao Gabriel and to Bage in Brazil, and from Paranaense to the neighboring state of Santa Catherina, Brazil. A long distance connection to Uruguayana in the Argentine was also connected during the year enabling Southern Brazil to obtain international telephone communication for the first time. In Chile, the Concepcion to Los Alamos long-distance route was also reconstructed during 1940.

Carrier System Installed

A 12-channel carrier system was installed during the year from Bucharest to Brasov in Rumania. This new installation considerably increased the number of long-distance conversations that may be made over the route. It is the first 12 channel carrier installation to be installed in Europe.

Three-channel and one-channel carrier installations were also made from Buenos Aires to Mendoza and to La Plata in the Argentine, from Timisoara to Sibiu in Rumania, as well as on various other smaller routes in the I. T. & T. System companies.

Special Activities

A large public address system was installed in the House of Deputies in the Argentine during 1940.

The service enabling the telephon-

XUM

ing of telegrams to expedite delivery was extended during the year to Santiago and Valparaiso in Chile and to Bucharest in Rumania.

Several hundred private automatic switchboards were installed in the I. T. & T. telephone companies during 1940. The International system has one of the largest developments and the most modern type of automatic switchboards. It offers automatic boards for small installations of two or three telephones in the office or home as well as many larger types enabling all classes of subscribers to have their own private intercommunicating facilities and connection to the entire outside telephone network through the same single instrument.

Many other special services were also given by the I. T. & T. companies during the year. The principal ones among these services offered were colored telephones, visual signals, automatic dialing instruments, weatherproof outdoor telephones, elevator telephones, supervisory sets, telephone amplifiers for the hard-of-hearing or for noisy environments, and loud-speaking telephones which enable every one in the room to hear a telephone conversation where this may be desired for conferences or meetings.

Time service, telephone typewriter service, and telephone answering secretarial service as well as many other desirable and helpful services were also given by many of the I. T. & T. companies.

In spite of the fact that several severe storms occurred in the areas in which the I. T. & T. companies operate and major earthquake catastrophies were experienced in Peru and Rumania during 1940, losses were not as large as would normally be expected and reconstruction and repairs were made quickly. In Peru where more than 2,000 telephones were put out of service by an earthquake in July, service was reestablished within ten days for all but 600 which were lost due to the destruction of the buildings in which they were installed.

In the recent earthquake in Rumania very little damage was done to the plant and the main service was reestablished within a few hours. In both Peru and Rumania, any heavier damage and interruption of service was prevented by I. T. & T.'s policy of modern, reinforced concrete company buildings.

The Operators' Corner

By MAYME WORKMAN

Traffic Supervisor, The Illinois Telephone Association, Springfield, Ill.

TRAFFIC peg counts and their use in meeting force requirements. Series No. 426

TRAFFIC studies known as "peg counts" are recommended in determining the number of people required at the present time and as a basis in making estimates to meet future operating force requirements.

In Illinois, the state regulatory body in its order in the matter relating to establishing standards of service for telephone utilities coming within its jurisdiction prescribes that "Traffic studies shall be made and recorded at regular intervals of not more than sixty (60) days, by each utility. Such tests will indicate to the officials of the utility and to the commission that the exchange has sufficient central office equipment to meet all requirements and that the operating force is sufficient to handle the traffic at all times with reasonable facility.

"The traffic studies shall include such items as the number of calls made during the busy hour and during other periods of day and night, together with the way in which this traffic is divided between operators, and the time of day when the heaviest loads occur."

The peg count has always been one of the most important records in the traffic department. This is particularly true at the present time when all telephone companies have been solicited to cooperate in our government's preparedness program.

The peg count is the basic record for determining the building and equipment requirements. When used as a basis for determining the hourly operating requirements, it assists in operating economically without strain on the operating force and at the same time prevents any deterioration in the quality of the service.

Because of the importance of this count, precautionary measures should be taken to assure its accuracy. In order to obtain an accurate peg count it is necessary to give this work the closest kind of supervision and work along instructive lines with the operating force.

It is important that all members of the operating force should know exactly what constitute peg count calls. Especially is this true of the chief operator and supervisory force so that when a doubtful case arises the operator can obtain a ruling immediately from her chief operator or supervisor.

Rules for Counting Originating Calls

One call is counted for:

1. Answering a line signal on which a person calling requests a connection or communicates with the operator for any purpose.

2. Completing or attempting to complete an order received in response to a cord signal or in response to a voluntary or disconnect supervision for connection to another number.

3. Completing or attempting to complete a call originally referred to a supervisor, intercepting or information operator.

4. Calling back an originating station and finally completing or disposing of a call, previously delayed on account of "busy," "don't answer," "no circuit" etc., whether or not accepted by the subscriber.

5. Plugging up a magneto line on which a subscriber is signaling another station on his own line.

The five foregoing rules are intended to make clear to an operator what calls should be counted by making the counting of the call dependent upon some significant circumstance in its handling. Thus Rule 1, under which about 95 per cent of the calls will be counted, provides simply that the operator receiving a call will count it if the subscriber communicates with her for any purpose.

Frequent Sources of Error

Failure to apply the five broad rules for counting calls to various types of originating calls in the manner just outlined is a considerable source of error. Forgetting to register calls on which special conditions are encountered such as subscribers speaking indistinctly or with a foreign accent, calls referred to information, etc., is also a cause of error. Errors are made in not registering calls offered on supervisory flashes as prescribed in Rule 2.

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COMING CONVENTIONS

Minnesota Telephone Association, Lowry Hotel, St. Paul, January 28, 29 and 30.

Texas Telephone Association, Texas Hotel, Fort Worth, March 19, 20 and 21.

***Oklahoma Telephone Association, March 24 and 25.**

***Kansas Telephone Association, March 27 and 28.**

Nebraska Telephone Association, Hotel Lincoln, Lincoln, April 8 and 9.

Iowa Independent Telephone Association, Hotel Fort Des Moines, Des Moines, April 15, 16 and 17.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 22 and 23.

***Indiana Telephone Association, May 7 and 8.**

***Pennsylvania Independent Telephone Association, May 15, 16 and 17.**

New York State Telephone Association, Hotel Jamestown, Jamestown, May 20 and 21. Golf day, May 19.

The Illinois Telephone Association, Hotel Pere Marquette, Peoria, May 28 and 29.

(Those state associations designated by an asterisk [*] will supply names of cities and hotels at a later date.)

Another common source of error is not registering at exactly the right moment, that is, while the operator is receiving the order from the subscriber. Rigid adherence to this rule should be followed as it results in practically perfect counting. The operator should register a call the instant she hears the subscriber's voice. An answer to a supervisory signal should be counted as soon as the operator is certain she has received a new call.

Major precautionary measures to assure an accurate peg count are:

1. Having the chief operator remind supervisors, instructors and operators as they take their positions that it is peg count day, and seeing that the proper methods of counting are explained to all the forces.

2. Checking meters and proper operation of the register buttons before taking count.

3. Checking proper method of registering calls.

4. Paying particular attention to see that relief operators start to count when they take their positions.

5. Keeping a practice count and giving preliminary instruction for one or two days before the regular peg count is taken.

6. Instructing student operators as to what constitute peg count calls and how they are to be counted. The purpose for which peg counts are used and the importance of having the counts accurate should also be explained at this time.

7. Maintaining accuracy in the clerical work involved.

8. Taking meter readings promptly on the clock hours so that they will be recorded exactly at 60-minute intervals.

The same general principles apply to both local and toll peg counts. Accuracy is the major factor. An inaccurate peg count is worthless.

Questions from Illinois Operators

1. What is the correct phrase to use in announcing a collect call?
2. What calls should you peg and what calls do you not?
3. What will make the term "Will you accept the charges?" on a collect call incorrect although "Wish you to accept charges" is the accepted term?
4. How should a "B" operator acknowledge a call; by saying "Right" or "Thank you?"
5. Is it possible to have conference calls of different classification, that is, person-to-person and station-to-station?

The answer to these traffic questions are presented on page 27.

Union Opposes Dial Telephone Installation

By a unanimous vote, the city council of Superior, Wis., on December 4 adopted a resolution opposing installation of dial telephones in the city by the Wisconsin Telephone Co.

The action was taken on petition of the telephone operators' union, which contended that the new system would deprive many operators of work, involving an annual payroll of $70,000.

Conforming with an order of the state public service commission, the company on December 10 halted the work of installing the new system.

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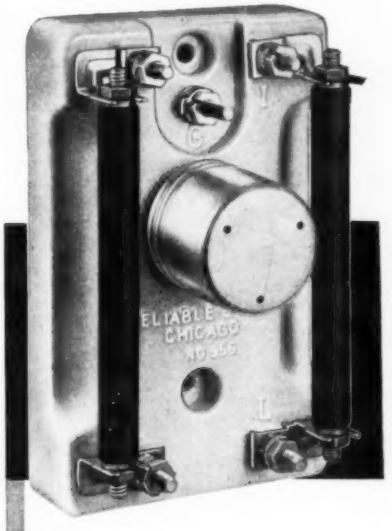

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Business Gains, New Developments

In Manufacturing Field

***ARMAMENT PLANS** for the nation bring avalanche of orders to Independent manufacturers of telephone equipment, from both the government and the operating companies. Research departments proceed with developments for improving telephone service*

DURING NORMAL times most of the Independent telephone manufacturers furnish communication equipment to various governmental branches. Under the National Defense Program they are being called upon to furnish masses of equipment, since they are experienced and equipped for the production of the type of equipment required by the various branches of the nation's armed forces.

In the paragraphs that follow, information is given concerning some of the larger Independent manufacturing companies, their developments during the year, and their efforts to cooperate with the nation's defense program.

Automatic Electric Company Meets Increased Sales Demand

Automatic Electric Company reports that sales to Independent telephone companies during 1940 were ahead of the 1939 volume in most brackets.

Inquiries for automatic equipment for moderate to large-sized exchanges received some impetus as a result of final governmental rulings as to the application of wage and hour legislation to telephone operating companies. In the small exchange field, there has been a continuation of the strong trend towards the adoption of small unattended automatic units, with some companies using them as a vehicle for opening up and developing wholly new exchange areas.

The speeding up of production in the country's industrial plants as a result of the National Defense Program has stressed the need for more efficient private exchange equipment. As a result, Automatic Electric Company reports greatly increased inquiries for private automatic branch exchange equipment, because of the facilities such equipment offers for fast, convenient interior service, and for various specialized control and communication services in industrial and business organizations.

Increasing interest in modern methods of toll switching is evidenced by steadily growing use of the company's remote control toll equipment. Several new installations have been completed or placed on order during the year, including equipment for Honolulu, T. H., Wilson and Fayetteville, N. C., Lima, Ohio, and Tampa, Fla. A novel feature of the last named installation is the use for the first time of rotor-relay switching equipment instead of the conventional step-by-step apparatus.

The telephone instrument business has been marked by a strongly-increased trend towards the use of Monophones, partly as a result of replacements of outmoded types and partly because of overall growth in the number of subscribers. In the fall of the year, the company introduced an addition to its line of Monophones in the shape of a compact set for extension, wall or desk-side use.

Increased demand for Monophones of all types has made it necessary for the company to modernize its plastic molding facilities and a new building erected for that purpose early in the year is now operating close to capacity.

The company's telephone rebuilding operations for Independent companies have also received substantial patronage during the year, telephone companies having found in this service a convenient and valuable means of rehabilitating subscriber station apparatus at very low cost.

Automatic Electric Company has for many years been supplier of communication equipment to the military and naval forces of the United States. The National Defense Program has naturally resulted in a sharp speeding up of the company's schedule of defense items, and there is every prospect that for some time to come a part of production facilities will be devoted to meeting government requirements. To avoid undue interference with normal deliveries to other customers, the company has taken steps to add to skilled personnel and increase productive facilities.

John Wicks, C. E. Lomax, H. F. Obergfell and M. L. Nelson of Associated Electric Laboratories, Inc., research and development affiliate of Automatic Electric Co. received citations as "Modern Pioneers." This was during the commemoration of the 150th anniversary of the American Patent System.

Kellogg Equipment Orders Very Satisfactory in 1940

The Kellogg Switchboard & Supply Co. reports that its business during 1940 has been very satisfactory indeed. A year-end bonus was paid to employes shortly before Christmas, and the company recently declared an extra dividend for stockholders.

The Kellogg company introduced several new developments and equipment improvements during the year. One was a new telephone instrument cord that will stretch and contract. This cord will stretch out when the user wants to use his handset or receiver, and then contract into a short length after conversation so the cord is kept free of the desk, table or other entanglements.

This new type cord is in the form of a coiled spring and was designed for unusually long life. The company stated the coil spring feature was adopted because it involves no lacing or braiding of conductors, thus eliminating friction.

During the year the Kellogg company made many installations of its new Relaymatic equipment. The company reports that sales on this type of equipment have been constantly accelerating, and that this indicates strength in the buying of central office equipment among small exchanges. It was stated that the medium and larger-sized exchanges are continuing to buy manual central office equipment.

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The company states it has many more developments in view but completion of them has been delayed somewhat by demands upon its research and laboratory facilities by the National Defense Program.

The Kellogg company, as are the other manufacturers, is getting a full share of government orders for equipment. The company has a fine new plant, which it states is efficiently equipped to manufacture a lot of material on a speedy production basis.

Every effort is being made to maintain deliveries to telephone companies, states the Kellogg company, particularly orders for switchboard additions, repair parts, etc. It is pointed out, however, that with the armament program likely to affect priority of raw materials, some delay may be caused in the securing of materials for the manufacture of standard apparatus. Telephone operating men should be fully informed of this situation and they are urged to allow ample time when ordering and, if possible, to order well in advance of present requirements.

Leich Electric Has Record Increase in Sales

Leich Electric Co. (and its affiliate company, Leich Sales Corp.) reports that 1940 was the most active business year since the company's founding in 1907. The new high sales record established in 1939 was surpassed by a large increase in both the volume of equipment manufactured and the number of telephone companies served.

A substantial portion of the increase was due to the record number of Leich common battery switchboards installed during the year. These streamlined units were introduced during 1939 and a number of installations immediately followed. The impetus resulting from their successful operation caused a large number of companies to contract for Leich equipment for delivery both in 1940 and 1941.

Sharing the spotlight during 1940 with Leich central office switchboards were the new floor type and cordless PBX's which also found unusual acceptance among telephone companies. The popularity of these new boards is shown by the fact that more than twice as many Leich PBX's were sold than in the best previous year in the company's history. Magneto switchboards, too, were produced in better than average quantities and consequently Leich's switchboard department operated at peak capacity throughout the year.

In substation equipment, the continuing demand for handsets resulted in increased manufacture of Leich instruments — both common battery and magneto. An interesting sidelight, too, was the extensive usage of Leich hand units, relays, keys and alnico generators by industrial organizations — a demand which increased throughout the year as industrial activity quickened.

Sales of telephone construction materials and supplies by the Leich organization showed a corresponding gain. Among the innovations introduced by Leich during the year was the packaging of standard insulated telephone wires in cartons rather than in paper-wrapped coils. Other new items which telephone companies used in increasing quantities throughout the year were dessicant (for drying out cables) and the recently introduced arsenic solder.

Overshadowing Leich's high rate of operations for normal telephone company consumption, however, was the prospect of increasing need of plant capacity to meet defense needs. Early in the year, it became apparent that the Leich organization—in common with other Independent telephone manufacturers — would be called upon to supply governmental departments with specialized communication equipment. Consequently, Leich Electric Co. immediately planned a factory addition which is now nearing completion.

The new building is of brick construction with concrete flooring. Nearly all wall space is devoted to large steel-casement windows which provide ample lighting for all types of work. Much of the additional 6,000 feet of floor space will be devoted to switchboard assembly with new shipping quarters at the end of assembly line. It is anticipated that the additional facilities will enable the company to accommodate defense work without unduly affecting deliveries of its equipment to telephone companies.

Stromberg-Carlson Finishes Year With Business Up 10 Per Cent

Sales during 1940 have exceeded last year's figures by 10 per cent, it was reported recently by Stromberg-Carlson Telephone Mfg. Co. Shortly before the end of the year the company was carrying a backlog of orders for all types of equipment 400 per cent greater than a year ago.

The 10 per cent increase includes telephones, switchboards, telephone supplies, and all other types of equipment. The radio business alone exceeded last year's figures when more sets were sold by the company than

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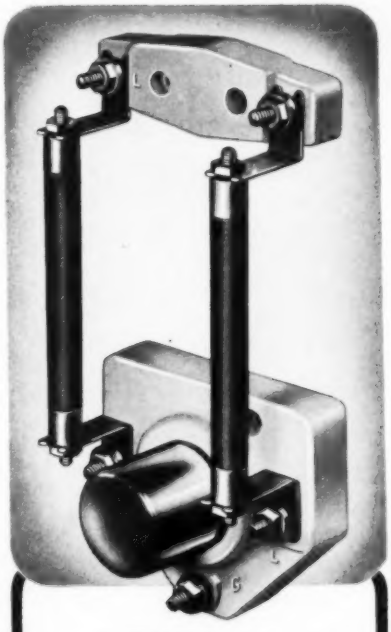

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in any other year since 1929, it was stated.

The year 1940 was one of engineering progress with Stromberg-Carlson, evidenced by a number of new products including Relaydial switchboards and several types of PBX equipment, actively marketed for the first time this year.

The new Stromberg-Carlson Relaydial switchboards fulfill the requirements of an exchange in which dial equipment lends itself particularly well in providing switching facilities for central office, PBX and inter-connected community exchanges, as well as satellites for larger exchanges.

Recognizing the importance of appearance in PBX boards that are open to public view, Stromberg-Carlson introduced two streamlined boards finished in attractive colors to give added eye-appeal. These new additions are the No. 120 and No. 121 cordless PBX switchboards, combining utility and efficiency with attractiveness.

Also in the field of inter-office equipment, Stromberg-Carlson added the selective talking feature to its intercommunicating telephone systems. The new 3-9ST and 2-10ST not only offer secret service for all outside calls, but on all inter-office calls from every station. These systems fill the need for selective ringing systems to provide local intercommunication and central office service from the same telephone without the services of an attendant operator.

Another new Stromberg-Carlson product introduced in 1940 was a chime bell box, in which rich-sounding chimes replace the standard gong.

The year was also marked by the citation of three Stromberg-Carlson engineers as "Modern Pioneers" during the commemoration of the 150th anniversary of the American Patent System. Benjamin Olney, J. H. Levis, and W. T. Powell were the men honored for their developments that have benefited the communication industry.

▼ ▼

Christmas Traffic Sets New Records

Long distance calls of the American Telephone & Telegraph Co. on Christmas Day were the heaviest for any holiday in the company's history. More than 160,000 calls were handled, an increase of 25 per cent over Christmas Day last year.

Overseas telephone communication exceeded that of a year ago with a total of 718 calls, and calls to South America exceeded pre-war volume.

Numerous cities and towns reported Christmas long distance traffic exceeding previous holidays. In Chicago, 34,978 long distance calls originated, setting a new all time record and running 35 per cent above 1939. In Cleveland, Ohio, a new record was set with 14,865 calls, 21.2 per cent above last year.

The New York Telephone Co. reported its long distance traffic rose to unprecedented levels, totaling more than 40 per cent above 1939. A record number of calls to the Pacific coast caused long delays in the afternoon.

The unusually heavy traffic was caused at least in part by the fact that the holiday fell in the middle of the week, it was stated. Many persons who ordinarily would have gone home used the telephone instead.

Commission and Court Activities

Appeals Court Bars Telephone Liquor Sales

The Springfield (Mo.) Court of Appeals on December 14 affirmed a decision of Circuit Judge Guy D. Kirby of Springfield that the Crown Drug Stores may not accept telephoned orders for intoxicating liquors. J. D. Clark, Springfield taproom operator, brought the suit.

In an unanimous opinion, the court ruled that the stores could not make liquor sales at places other than those covered in their licenses; and that in telephone sales, title to the liquor passed at the place of delivery, when it was paid for, rather than at the store where the order was taken.

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Approve Rates for New Ohio Exchange

The Ohio Public Utilities Commission on December 13 authorized the Ohio Central Telephone Co. to file, effective as of October 1, a tariff for automatic service at the new Wayland exchange, which is composed of the southern portion of the company's Windham exchange.

In its application, the company set forth that construction by the federal government of the huge Ravenna ordnance plant had divided the Windham exchange into two unconnected portions. The government and all but one of the subscribers in the southern part of the exchange area agreed to the change.

Rates for the new service, as compared with rates for the magneto service which was formerly furnished in the area, are as follows: Business independent line, raised from $4.25 to $5.00; business two-party, $3.75 to $4.50; business rural, $3.75 unchanged. Residence independent, $2.75 to $3.00; residence five-party, $2.00 to $2.25; residence rural, $1.75 to $2.25.

The commission order, which approved the new exchange boundaries and rates, carried a provision that free toll service between the Windham and Wayland exchanges shall be discontinued whenever the federal government shall prohibit the further maintenance of free toll circuits through the reservation.

▼ ▼

Company Starts Action Against Directory Publisher

The Lincoln (Neb.) Telephone & Telegraph Co. has started action in the local court at Nebraska City, Neb., to enjoin the Baldwin Consurvey Co., of Parsons, Kans., from distributing a directory of the telephone company's Nebraska City subscribers.

The company also asks for an order requiring the Kansas publishers to collect and turn over to the court all copies it has already distributed, contending that the publication was an infringement of the copyright under which it issues directories of its own.

The petition of the Lincoln company states that the telephone directory it publishes is a valuable, profitable and necessary part of its business and that the publication of the Consurvey directory would destroy the value of the company's book as an advertising medium.

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Fined for Using Slugs in Pay Stations

Charged with putting slugs in pay telephones, Harry K. Chalmiers, of Chicago, 43-year-old former professional baseball player, recently received in city court at Logansport, Ind., a fine of $300 and costs and a sentence of 90 days on the Indiana

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penal farm. It was the heaviest fine imposed in city court there in 10 years. A large bag of slugs was found in Mr. Chalmiers' possession.

Summary of Commission Hearings and Rulings

Federal Communications Commission

December 12: Granted authority to Inter-Mountain Telephone Co. to supplement existing facilities between Marion and Wytheville, Va., and between Wytheville, Va. and Bristol, Tenn.

Illinois Commerce Commission

December 18: Illinois Bell Telephone Co. filed revisions of the base rate area at Zion.

December 20: Illinois Bell Telephone Co. filed revised tariff sheets, reducing the charges for service between Chicago and Palos Park, and extending metropolitan service to include Palos Park.

Minnesota Railroad & Warehouse Commission

December 23: Authorized Grant County Telephone Co. to place in effect at Elbow Lake new and higher rates for common battery service, replacing the present magneto system.

New rates, all raised 25 cents over former rates for the old service, include:

Business individual line wall or desk, $3.25; business individual line, handset, $3.50; business two-party wall or desk, $2.75; business two-party, handset, $3.00. Residence individual line, wall, $1.75, desk, $2.00, handset, $2.25; residence two-party, wall, $1.50; desk, $1.75, handset, $2.00.

Rural multi-party wall set remains at $2.00; new rural multi-party desk set is $2.25. Discount of 25 cents if paid on or before 20th of month in which service is rendered.

December 23: Authorized S. Frederick, owner of Hewitt Telephone Exchange Co. to sell, and the Bertha Telephone Co. to purchase, property of the former company at Hewitt.

Missouri Public Service Commission

December 20: Approved application of United Telephone Co. to sell and Anson Tippey to purchase the telephone exchange at Papinsville.

January 20: Hearing in the proceeding instituted by the commission to obtain appraisal, audit and other information from the Southeast Missouri Telephone Co. for use of commission.

Nebraska State Railway Commission

December 22: Complaint filed by C. M. Bosley, attorney for village of Hayes Center, alleging that, without commission authority, the Central Nebraska Telephone Co., of Denver, Colo., has discontinued service from its exchange at Palisade, heretofore furnished without cost.

December 26: Application filed by Northwestern Bell Telephone Co. for authority to suspend for the year 1941 application of its rule covering a minimum of five subscribers on service station lines. This would continue the suspension of the rule which was in effect in 1940. Economic conditions have not improved in the farming areas served.

New York Public Service Commission

January 2: Hearing at New York in the proceeding on motion of the commission as to failure of New York Telephone Co. to supply telephone service to persons residing at Parkchester Apartments, The Bronx, New York City.

January 3: Hearing at New York in the proceeding on motion of the commission as to rates, charges, rules, regulations and practices of New York Telephone Co. with respect to cable carrying charges.

Ohio Public Utilities Commission

December 27: Application filed by Ohio Standard Telephone Co., seeking authority to increase rates at its Farmersville exchange. Proposed increases are:

Business independent line, $1.50 to $3.50; business multi-party, $1.25 to be discontinued; business rural, $1.25 to $2.50. Residence independent line, $1.50 to $2.25; residence multi-party, $1.25 to be discontinued; residence four-party, new, $1.75; residence rural, $1.25 to $1.75.

The application was referred to engineers of the commission for checkup and report.

Wisconsin Public Service Commission

December 30: Hearing at Madison in matter of alleged refusal of Wisconsin Telephone Co. to extend lines from its Waukesha exchange to serve the Wern Farms in the town of Genessee, Waukesha county.

Answers to Traffic Questions on Page 23

1. In announcing a station-to-station collect call, say, for example: "I have a collect call for anyone from Mr. Hill at Springfield. Will you accept the charge?" In announcing a person-to-person collect call, say, for example: "I have a collect call for Mr. Brown from Mr. Hill at Springfield. Will you accept the charge?"
2. Please refer to the text of this week's article.
3. "Wish you to accept charges" is *not* the accepted term. The correct announcement phrases are contained in the answer to question No. 1.
4. "Right" and "Thank, you" are both correct forms of acknowledgment. The "B" operator should use the one which best fits the condition requiring an acknowledgment.
5. Yes. However, the person-to-person rate applies on all conference calls.

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Influence of Defense Found In 1940 Resume of Industry

(Continued from page 13)

Co. and the Bell Telephone Co. of Pennsylvania, to conform with interstate rates of the A. T. & T. Co.

Effective August 1, the Southern Bell Telephone & Telegraph Co. filed with the FCC a new and reduced schedule of interstate message toll rates for service in the southeastern states, amounting approximately to $525,000 annually. The schedule agrees with A. T. & T. rates.

New intrastate toll rates for the New York Telephone Co. totaling $706,000 annually were announced in August by the New York Public Service Commission.

High Court Dismissed Pennsylvania Toll Case

The intrastate toll rate order of the Pennsylvania commission was upheld by the U. S. Supreme Court January 29 by a dismissal of an appeal of the Bell Telephone Co. of Pennsylvania. It was held that no substantial federal question was involved. The company was thus required to make toll reductions amounting to $600,000 a year, conforming with A. T. & T. schedules.

The case started several years ago followed by the commission's order in 1937 to reduce intrastate toll rates, and the state supreme court ruled July 11, 1939.

Rules Against Connecting With Privately-owned Systems

Holding that "divided ownership is incompatible with efficient telephone regulation," the Pennsylvania Public Service Commission on January 8 refused to direct the Bell Telephone Co. of Pennsylvania to establish trunk connections with a privately-owned dial intercommunicating system located in the offices of McCloskey & Co., Philadelphia. (The investigation started January 3, 1938, after an informal complaint had been filed by the McCloskey company.)

The commission pointed out that it has supervisory powers over public telephone facilities but would be unable to regulate privately-operated systems. "Uncontrolled private ownership," declared the order, "is not as conducive to economy of operation or to technical advancement of the telephone industry as full ownership by the company."

Company Rule on Telephone's Use Declared "Unreasonable"

A telephone company regulation that each instrument be installed for the exclusive use of the subscribers, members of his family and his employes was held to be "unreasonable" by the Arkansas Supreme Court April 8. It affirmed a lower court's findings that the Southwestern Bell Telephone Co. had discriminated against two Fayetteville, Ark., business houses in refusing them service at the same rate paid by similar establishments there.

The U. S. Supreme Court refused to review the case, October 14, on the ground that no federal question was involved, and dismissed an appeal brought by the Southwestern Bell.

Telephone Companies Lose In REA Cases

The Kentucky Court of Appeals ruled in favor of the REA, March 19, when it held that a rural electric cooperative may interfere "to the point of destruction" with the operation of a telephone system in the absence of proof that the cooperative interfered "unnecessarily" or was negligent. The Holland (Ky.) Telephone Co. had complained against inductive interference in its telephone lines and was awarded $500 damages by the Allen County Circuit Court.

In another state a telephone owner again lost its case against the REA. The Mississippi Supreme Court ruled June 3 that the REA cooperative in Jones county did not have to pay an $800 judgment voted in favor of the telephone exchange at Ellisville, Miss., by the Jones County Circuit Court. The power cooperative appealed, asserting the damage could have been avoided by the installation of a second wire for a return circuit for the telephone system instead of using the earth for that purpose. The supreme court recognized the contention.

Ruling Made in "Foreign Attachments" Case

The matter of foreign attachments to telephones came up during the year, in the case of Pastor v. American Telephone & Telegraph Co. asking for treble damages under anti-trust laws. The U. S. District Court, southern district of New York, on July 9 held that the plaintiff had no cause for action on the Bell policy against use of "foreign attachments" in conjunction with subscribers' stations.

The plaintiff alleged that he invented and owns a patent on a device konwn as an automatic repertory dial device which, when attached to dial telephones, enables the calling of certain pre-selected calling stations by a single manipulation, pressing a button. The device had been offered to the Bell in 1927 and 1928 and was rejected.

Commission Has Right to Regulate Hotel Rates

Rates for telephone calls made from hotels again became an issue when the New York Telephone Co. started action January 12 in the state supreme court against Hotel Commodore in New York City to enforce tariffs fixed by the commission. In an order issued October 21 the New York Supreme Court, third district at Albany, ruled that the commission has the right to regulate hotel rates.

The hotels had protested that they performed service at some considerable expense to themselves; that it was not a public utility service, and that the charge they made for telephone service was their own concern.

Old and New Rate Cases In the Telephone Field

The investigation of Pacific Telephone & Telegraph Co. rates in the state of Washington was resumed early in the year by the Washington Department of Public Service. Taking of testimony was completed May 1.

The Pacific company was denied permission to increase rates in its Washington exchanges, whereupon a court petition was filed August 2 asking a review of the state commission's order.

A sweeping order October 31 by the Washington commission reduced the Pacific Bell rates in the state more than one million dollars annually. An appeal was taken to court and permission granted November 26 for a review of the reduction order. The company declared the order to be contrary to the law and evidence, and arbitrary.

* *

The St. Paul, Minn., rate case of the Tri-State Telephone & Telegraph Co. had a busy time during 1940, having been carried forward from the previous year as unfinished business. An appeal taken to the Minnesota Supreme Court in January was ruled on July 5, at which time the court upheld the May 2, 1939, compromise order of the Minnesota Railroad & Warehouse Commission following agreement with the company.

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The court affirmed discretionary powers of the commission in fixing rates, holding that the commission has authority to sanction new rates proposed by a company without formal notice of hearings and taking of testimony, if satisfied that the rates are just and reasonable.

The city of St. Paul and others then appealed to the U. S. Supreme Court to review the Minnesota court's decision, and the Tri-State company filed a brief in opposition to the city's petition. The issue in the case involved the right of a regulatory commission to negotiate with utilities for a revision of a rate finding because of changed economic conditions, when such revision is made without hearings and valuation proceedings.

Just before the year ended the U. S. Supreme Court, on December 16, declined to review the case.

* *

In Oklahoma the commission's investigation of the Southwestern Bell Telephone Co., started in 1936, resulted in an order issued February 21, 1940, fixing telephone rates on a statewide grouping basis for Oklahoma exchanges. The order established the state as a whole as the basic unit for rate-making purposes. Telephone rates were reduced in 36 cities and increased in 12 others, accomplishing a statewide net reduction of $46,835 annually.

The company appealed to the Oklahome Supreme Court March 27 claiming the commission's order would result in confiscation of its property in Oklahoma. It asked that the order be vacated and that constitutional rights be exercised permitting the company to inaugurate rates that will permit a fair return.

* *

The Mississippi Public Service Commission announced March 22 that a reduction in telephone rates in the state, particularly on rural lines, would be made by the Southern Bell Telephone & Telegraph Co. The reductions were agreed upon following conferences between the commission and company officials.

* *

The Illinois Bell Telephone Co. placed rate reductions into effect November 6 which will aggregate about $765,000 annually, following informal negotiations with the state commission. The reductions resulted in lower intrastate toll rates on 43-mile calls, totaling about $450,000. Monthly charges for residence extension telephones were lowered, amounting to a reduction of $65,000. The remaining $250,000 in the estimated reduction annually will result from reductions in monthly flat rates for local telephone service in about 70 communities.

* *

The U. S. Supreme Court on February 5 denied the appeal of the Wisconsin Public Service Commission for a review on certiorari of the Wisconsin Telephone Co. rate case, appealed from the Wisconsin Supreme Court which upheld the decision of the Dane County Circuit Court against the commission's final rate reduction order.

The United States court's denial of the appeal was on the ground that no federal question was involved. The court stated it was "unable to find that the decision of the highest court of the state did not rest upon an adequate non-federal ground."

It was contended by the state commission that the Wisconsin Supreme Court had erroneously accepted the view expressed in some U. S. Supreme Court decisions that reproduction cost must control in determining rates that will allow a reasonable return on property of a public utility. The commission said this doctrine had been limited, if not overruled, by the U. S. Supreme Court after the "prudent investment" theory had been proposed. The Supreme Court left the issue undetermined by its refusal to consider the case.

* *

Just as the year ended an investigation was ordered of the properties of the Chesapeake & Potomac Telephone Co. by the District of Columbia Public Utilities Commission. It was expected that a public hearing would be set soon.

I. T. & T. Desires to Sell Rumanian Property

The International Telephone and Telegraph Corp. is negotiating with the Rumanian government for the sale of its telephone properties in the kingdom, it was disclosed December 14 at the corporation's New York offices. The Rumanian subsidiary, Societatea Anonima Romana de Telefonae, operates under a government contract signed in 1930.

At the end of 1939 the Rumanian company's balance sheet showed $25,941,882 plant and property valuation and $2,416,356 current assets. Since the subdivision of Rumania in recent months, the company has been negotiating for recovery of or compensation for facilities acquired by other countries in taking over territory from Rumania.

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Summary of the Bell System's Technical Progress

(Continued from page 16)

containing relays and power supply, which, up to now, has had to be installed on the premises. When ringing current is applied to a line, it lights the neon lamp associated with that line and at the same time sounds the buzzer.

An Improved Wiping Solder

After comprehensive experimentation, there has been developed a new "wiping" solder with markedly improved handling characteristics. The lead sleeves that go over splices in telephone cable are joined to the cable sheath by this solder, which takes its name from the way it is applied. The splicer first pours molten solder over the area to be covered, then catches some of the semi-molten mass in a cloth and wipes or molds it into place.

In the new solder, a small amount of arsenic has been added to the lead-tin alloy. The result is a finer-textured solder which solidifies more slowly and can be manipulated longer. Formability is improved and the forming period increased. This facilitates to no small extent the wiping of leak-proof joints. No hazard is introduced by the presence of arsenic in the solder.

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Varistors and Thermistors

In the last few years a class of semi-conductors, called "varistors" because their resistance is variable, has been put to increasing use in telephony. Two types may be mentioned, although they do not complete the list.

In the copper-oxide varistor — a washer or disc of copper with an oxidized surface, to which an outer film of conducting material is applied—the current varies with the direction of the applied potential and also with its magnitude.

This type is used to rectify alternating current and convert it into direct current; it plays an essential part in modulators and demodulators in carrier and coaxial cable projects; and it has other uses as a low-voltage protective device and as a means of obtaining message registers for party lines, which must operate on current flowing in one direction but not in the other.

Another type of varistor has been given the name "thermistor" because its resistance varies with temperature. One application of the thermistor is to prevent surges on the line from causing false operation of certain types of relays. In trial installations, thermistors have been used successfully on "K" carrier and coaxial cable projects to regulate the level of amplification.

DR Tape-Insulated Splices

During the year a new type of splice for rubber-insulated wires was introduced. Single-tube sleeves pressed in place, similar in principle to the rolled sleeve that has performed so successfully in line wire splices, are used to splice the conductors.

The DR tape, which consists of a layer of plastic adhesive rubber on a vulcanized rubber backing, is then laid over each conductor splice and pressed together with the fingers. An overall covering of friction tape is applied in the usual manner.

As the sleeves are elongated by the pressing operation, it is possible to equalize the length of the two conductors by varying the number of presses above the minimum required for holding power, and thus maintain the full tensile strength of the wire. The layer of vulcanized rubber in the DR tape permits making the conductor splices side by side, which in turn facilitates the equalizing operation and keeps the length of the splice to a minimum.

Lashed Cable

Substantial progress has been made in the lashing of aerial cable to the supporting strand by means of a spiraling galvanized steel wire. More than 5,000 miles of cable are now supported in this manner, which eliminates the use of cable rings.

An improved lashing machine that provides smoother and easier operation has been developed; also, improved methods have been worked out for terminating the lashing wires and for supporting lashed cables at pole positions, corners and splices.

Such lashing of aerial cable is one means of preventing trouble from chafing of the lead sheath. Where aerial cable is suspended by rings from the supporting strand, expansion and contraction of the cable with temperature changes, and movement by wind or other causes, tends to result in chafing of the sheath by the rings.

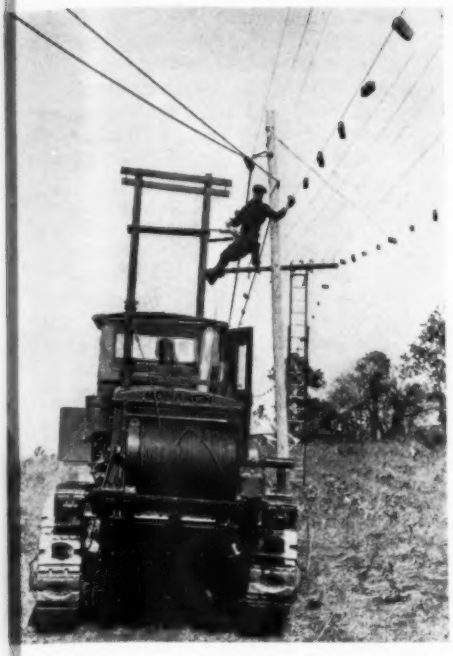
Special Line Wire Ties

There has been continued investigation of means of preventing fatigue and abrasion troubles at insulators in open wire lines, and a new form of tie has been developed. The line wire is reinforced by wrapping on it a preformed spiral wire tie; the assembly is then fastened to the insulator by a flat metal strap, in the case of copper line wire, or by a soft wire on steel line wire.

The new tie has not only been advantageous for use in new lines but has also been found useful for reinforcing sections of line wire that have been abraded by the older forms of ties. It develops high longitudinal holding power, and spans adjacent to wire breaks sag far less. This feature is of particular value at highway and rail crossings.

Vicalloy—a New Magnetic Alloy

On June 20, 1940, public announcement was made of "Vicalloy," a new magnetic alloy of remarkable qualities. This alloy can be made to hold more permanent magnetism than any other commercial material. In addition, it can be drawn and rolled—a property of decided advantage in many applications, and not possessed by other permanent magnet materi-



It isn't always winter at the Bell Laboratories field station at Chester, N. J., so bricks are substituted for ice on experimental open wire lines to find out how well tie-wires will sustain the weight they must bear during snow and sleet storms.

als of importance in the telephone art.

Vicalloy is composed of vanadium, iron and cobalt; it takes its name from the initial letters of its three components. This is the alloy employed in the endless magnetic tapes used in Bell telephone weather-announcing systems.

Such weather-announcing systems were last year placed in operation in Baltimore, Washington, D. C., Detroit and Boston. Previously, weather-announcing service had been made available in and about New York City and in Chicago.

Overseas Radiotelephone Service

Direct transatlantic service to Amsterdam and Paris was suspended following the German occupation of these cities. The New York-Rome and New York-London circuits were continued; in addition, direct New York-Berlin and New York-Berne circuits were put into service on July 10, and a New York-Madrid circuit on October 22. The latter circuit is used jointly by Rome and Madrid.

Service to Poland and to the Scandinavian countries, which had been interrupted during a portion of the year, was restored by way of Berlin in September. At the end of the year, service was available to all of Europe except Belgium, France, Gibralter, Luxemburg and The Netherlands, where service had not been restored, and Russia, Greece and Turkey, which were the only countries in Europe to which service had not previously been established.

Messages to certain countries of Europe, however, were subject to restrictions imposed by their respective governments. Service to Africa and parts of Asia which was routed via Europe has been suspended since the start of the war.

In spite of the reduction in transatlantic calls, the total volume of overseas traffic was nearly as great as it was before the outbreak of the war, due to substantial increases in traffic to Hawaii and South America. The increase in traffic to South America has made it necessary to use the circuit usually employed for ship communication to supplement the regular circuits, a temporary arrangement pending the completion of additional permanent facilities.

Improvements have been made in operating arrangements on the circuits to Caribbean countries, and new antennas have been provided to improve transmission to that area.

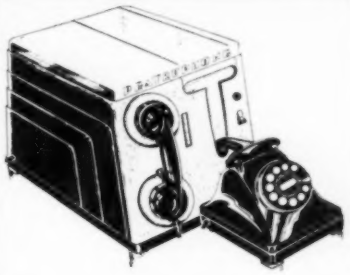
Coastal and Harbor Radiotelephone Service

Over 2,500 vessels are now equipped for coastal and harbor radiotelephone service. The land stations in this service are connected to the telephone network, hence anyone telephoning from a ship may be connected directly to any telephone on land or to any other ship telephone.

At the close of 1940 there were 14 radiotelephone stations serving the waters of the Atlantic, Pacific and Gulf coasts, of which 13 are Bell System stations. In addition there are six non-Bell stations serving the Great Lakes and other inland waterways.

Four new stations were put into service by the Bell System during the year at Galveston, Texas; Wilmington, Del.; Charleston, S. C. and Tampa, Fla. Furthermore, to care for the increased demand for service, another radio transmitter was added and a second channel established at the Bell station in New York. Two new stations at Portland, Ore., and Astoria, Ore., will be placed in service early in 1941.

The rules of the Federal Communications Commission governing this class of radio service, particularly on the Great Lakes, were extensively revised in 1940, following agree-



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ments between the United States and Canada relative to frequency assignments. Because the frequencies in the portion of the radio spectrum assigned to coastal harbor service are insufficient to permit exclusive use by any single station, the general plan adopted involves sharing frequencies between various stations far apart from each other.

Frequency-Modulation Program Transmission

With the advent of frequency-modulation broadcasting, the Bell System will be able to meet any need of the broadcasting industry for program transmission channels better than those now generally utilized.

The principal broadcasting organizations now use intercity networks which transmit programs from about 100 to 5,000 cycles. Under most conditions, results have been satisfactory. However, the Bell System has demonstrated to the principal broadcasting companies, over circuits as long as 2,000 miles, program transmission channels capable of handling a 60 per cent greater band width.

In the case of more than 50 transmitting stations, studio-transmitter channels which will transmit from about 50 up to about 8,000 or 10,000 cycles are now being furnished; and, in a number of instances, channels transmitting frequencies up to 15,000 cycles have been provided between studios and transmitters of broadcasting stations.

Coin-Phonograph Music by Wire

Recently, in a number of instances, coin-operated phonographs have been connected to centralized sound studios over circuits provided by the telephone companies. With a wide selection of records on hand at the studio, the customer has far greater range of choice than when the records are in the phonograph itself.

Various means whereby the customer may communicate his wishes to the studio have been devised by different manufacturers. In one typical arrangement, insertion of a coin in the machine brings in a signal at the studio, where an attendant responds by asking what record is wanted. The customer hears the attendant's voice through the loud speaker in the phonograph, and answers by talking into a transmitter or microphone.

18-Channel Voice-Frequency Telegraph System

Development has recently been completed of an improved voice-frequency carrier telegraph system, furnishing as many as 18 telegraph channels covering the frequency range from 255 to 3,145 cycles on a four-wire line. The new system produces better transmission, channel for channel, than has been possible with the older arrangements. Also, it includes many simplifications which reduce the cost and size of the apparatus units below those of the systems it supersedes.

A material reduction in maintenance effort is expected, so that the new system will be suitable not only for very long circuits, but also for shorter lines than are economical with the former systems. Existing 12-channel systems may be built out to provide as many as 18 channels, when the line facilities are suitable, by the addition of equipment of the new type.

Automatic Concentrators in Teletypewriter Service

Teletypewriter exchange service continued to expand during 1940. Until recently, each outlying subscriber has been connected to the nearest teletypewriter exchange switchboard by an individual direct line. Last year, in several places, a new arrangement was installed. From the switchboard a small group of trunk lines run out to a so-called automatic concentrator in or near the outlying district. The concentrator is connected to as many as 100 subscribers' lines.

When a subscriber originates a call, the equipment at the concentrator selects an idle trunk to the switchboard, where the operator handles the call in the usual way. To call a subscriber, the operator connects to a trunk to the concentrator and then types the call number. This causes the concentrator to select the proper subscriber's line. Many miles of TWX circuits are saved by this arrangement.

Key Equipment for Airway Traffic Control

In recent years the United States Civil Aeronautics Authority (now the Civil Aeronautics Board) has established a number of control offices at the larger airports to coordinate airline traffic. These "airway traffic control centers" not only regulate the movement of planes at the local airport, but also control traffic at other airports within the control area—which averages 1,200 miles of civil airways for each center—and regulate, in the interest of safety, all aircraft flying within the area.

Communications facilities for each control center were first designed and provided locally to meet its specific needs. This resulted in considerable variation in arrangements. Last year, in collaboration with the Civil Aeronautics Authority, and following trial usage at the control center at Newark Airport, a new key equipment designed by Bell Telephone Laboratories was standardized for use at control points throughout the country.

By means of this equipment, each control office is in constant communication with a number of points at the local airport, such as the dispatchers' offices of the various airlines, the airport control tower, the weather bureau station, and any nearby Army or Navy air station. In addition, it is able to communicate with other airports in the area over private telephone lines, and has access to the local airport PBX and the nearest central office.

Intercommunicating System for Smaller Airports

For the use of the Civil Aeronautics Board at smaller airports, a simpler intercommunicating system has been made available. This consists of a single circuit to which all stations are connected. Each station is equipped with a hang-up type telephone and a loudspeaker. The loudspeaker at each station is connected to the line at all times except when its associated handset is removed from the hook.

By means of this arrangement, anyone wanted at any station may be signaled or paged through the loudspeaker, and any conversation on the circuit may be monitored.

Special Safety Activities

During the year, two special activities were included in the safety programs of the Bell companies. One was the use of the sound motion picture "How It Happened"—the first picture of its kind to be prepared in the Bell System. Its production was prompted by a desire to find some new way of giving emphasis to the many activities that are being carried on to insure safety on the job. Over a long term these activities have produced a gratifying reduction in plant accidents.

However, current records show that the majority of accidents occurring are avoidable. The picture, in addition to portraying how ten accidents occurred in the previous year, also explains how accidents due to similar circumstances may be avoided in the future. It appropriately ends with the following slogan: "No job is so important and no service so urgent that we cannot take time to perform our work safely."

Bell companies are also making

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wide use of a "Pole, Ladder and Electrical Safety Demonstration Board" for demonstrating and developing the causes of these three types of accidents. The accident cases set up on the board by the use of model equipment closely simulate actual accidents, in striking fashion. Those attending the demonstrations are given an opportunity to discuss in each case the right way to do the job.

Both motion picture and demonstration board have been valuable in emphasizing that the most serious types of accidents may be avoided if the generally accepted safe procedures are followed; in addition, they have proved to be unusually effective training media.

Philadelphia-New York Television Transmission

The 1940 national elections, and the conventions which preceded them, imposed extraordinary demands on communications services. In the work of bringing the news to the public, the many services developed and provided by the telephone companies helped to make possible a degree of "coverage" never before attained.

One novel experiment was the transmission of 441-line television signals by wire from the Republican National Convention in Philadelphia to Radio City in New York. This was done over cable facilities provided by the Bell System. At New York, the television signals were broadcast by the National Broadcasting Co. The cable distance of 108 miles, for most of which the coaxial cable was available, was the longest line relay in the history of high definition television.

Inductive Coordination of Power and Telephone Systems

Further progress was made in cooperative studies of structural and inductive coordination by the Edison Electric Institute and the Bell System. Several reports dealing with various phases of this matter were completed by the joint sub-committee on development and research of the two organizations.

Among the more important problems studied in 1940 were the harmonics produced by rectifiers, and inductive exposures between rural electric lines and open wire telephone lines. Rectifier problems fell into two general categories; involving (1) large installations ranging up to 50,000 kw or more, mainly in the metallurgical field, and (2) smaller installations ranging from a few kw up to a few thousand kw, such as those associated with radio stations and smaller industrial applications.

In the first category phase shifting arrangements, whereby the equivalent of a relatively large number of phases (for example, 24, 30 or 36) is secured, were extensively and successfully used to limit the harmonics. In the second category, frequency selective devices to limit harmonics were applied in a number of cases.

In the field of rural inductive coordination, marked progress was made on improved and less expen-

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sive methods for limiting harmonic voltages and currents on rural power circuits, and for limiting unbalances of telephone systems. In the latter field may be mentioned the increased use of "rolled joints" or "compression joints," and improvements in the balance of station sets and central office equipment.

In addition to these major problems, other aspects of inductive coordination have been under study, including the effects of power factor correction capacitors on power distribution systems, the increasing use of fluorescent lighting, and the problems associated with the harmonics arising in motors.

The increasing extension of power transmission systems and telephone toll routes has necessitated consideration of a number of problems of low frequency induction under fault conditions.

Electrolysis Switch

An improved electrolysis switch has been developed for use in electrolysis drainage connections where reversals in the direction of the current flowing in the drainage wire are encountered.

Principal features of the new switch are the use of a drain relay having mercury contacts sealed in glass and means for adjusting the drainage voltage at which the switch releases. The new switch is more stable in operation than previous designs and eliminates troubles formerly experienced, such as burning of contacts and alternating current chatter.

Complex Number Computer

In the design of electrical filters and networks, and in the solution of other communications circuit problems, lengthy calculations are required involving "complex" numbers —numbers composed of two parts, the distinction between which must be maintained when they are multiplied or divided. To handle such calculations automatically, an electrical super calculating machine has been developed.

The machine is constructed entirely of standard telephone apparatus, using for its computing elements relays and crossbar switches. A two-way telegraph circuit connects the machine to a teletypewriter with a special keyboard, on which the operator writes out the problem. The calculator immediately begins to obtain the answer, which is returned in the form of telegraph signals and printed on the teletypewriter.

The calculator is located at the Laboratories in New York; the teletypewriter wherever convenient.

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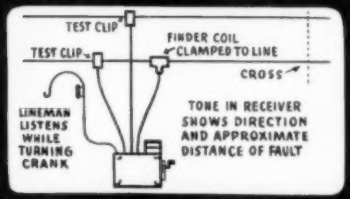
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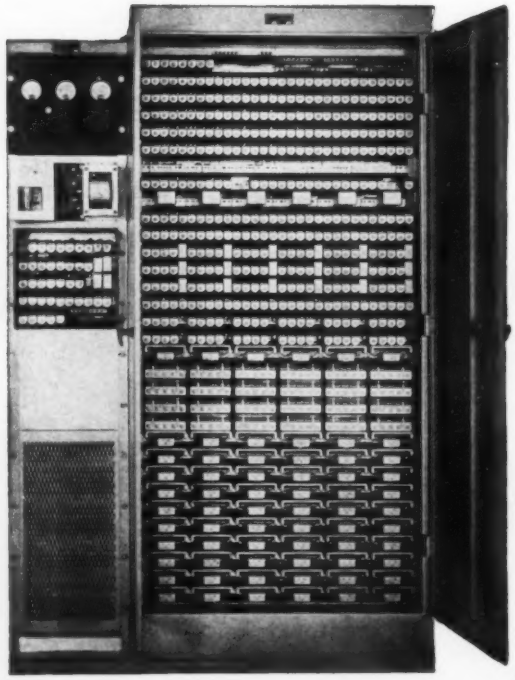

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